Leo Sher
Alexander Vilens
Editors

War and Suicide

Psychiatry - Theory, Applications and Treatments Series

NOVA

PSYCHIATRY- THEORY, APPLICATIONS, AND TREATMENTS SERIES

WAR AND SUICIDE

No part of this digital document may be reproduced, stored in a retrieval system or transmitted in any form or by any means. The publisher has taken reasonable care in the preparation of this digital document, but makes no expressed or implied warranty of any kind and assumes no responsibility for any errors or omissions. No liability is assumed for incidental or consequential damages in connection with or arising out of information contained herein. This digital document is sold with the clear understanding that the publisher is not engaged in rendering legal, medical or any other professional services.

PSYCHIATRY- THEORY, APPLICATIONS, AND TREATMENTS SERIES

Attention Deficit Hyperactivity Disorder (ADHD)
Stuart M. Gordon and Aileen E. Mitchell
2009 ISBN: 978-1-60741-581-7

Attention Deficit Hyperactivity Disorder (ADHD)
Stuart M. Gordon and Aileen E. Mitchell
2009. ISBN: 978-1-60876-699-4 (Online Book)

War and Suicide
Leo Sher and Alexander Vilens (Editors)
2009. ISBN: 978-1-60741-978-5

PSYCHIATRY- THEORY, APPLICATIONS, AND TREATMENTS SERIES

WAR AND SUICIDE

LEO SHER
AND
ALEXANDER VILENS
EDITORS

Nova Science Publishers, Inc.
New York

Copyright © 2009 by Nova Science Publishers, Inc.

All rights reserved. No part of this book may be reproduced, stored in a retrieval system or transmitted in any form or by any means: electronic, electrostatic, magnetic, tape, mechanical photocopying, recording or otherwise without the written permission of the Publisher.

For permission to use material from this book please contact us:
Telephone 631-231-7269; Fax 631-231-8175
Web Site: http://www.novapublishers.com

NOTICE TO THE READER

The Publisher has taken reasonable care in the preparation of this book, but makes no expressed or implied warranty of any kind and assumes no responsibility for any errors or omissions. No liability is assumed for incidental or consequential damages in connection with or arising out of information contained in this book. The Publisher shall not be liable for any special, consequential, or exemplary damages resulting, in whole or in part, from the readers' use of, or reliance upon, this material. Any parts of this book based on government reports are so indicated and copyright is claimed for those parts to the extent applicable to compilations of such works.

Independent verification should be sought for any data, advice or recommendations contained in this book. In addition, no responsibility is assumed by the publisher for any injury and/or damage to persons or property arising from any methods, products, instructions, ideas or otherwise contained in this publication.

This publication is designed to provide accurate and authoritative information with regard to the subject matter covered herein. It is sold with the clear understanding that the Publisher is not engaged in rendering legal or any other professional services. If legal or any other expert assistance is required, the services of a competent person should be sought. FROM A DECLARATION OF PARTICIPANTS JOINTLY ADOPTED BY A COMMITTEE OF THE AMERICAN BAR ASSOCIATION AND A COMMITTEE OF PUBLISHERS.

LIBRARY OF CONGRESS CATALOGING-IN-PUBLICATION DATA

War and suicide / [edited by] Leo Sher and Alexander Vilens.
p. ; cm.
Includes bibliographical references and index.
ISBN 978-1-61668-274-3 (E-Book)
1. Soldiers--Suicidal behavior. 2. Veterans--Suicidal behavior. 3. War--Psychological aspects. I. Sher, Leo. II. Vilens, Alexander.
[DNLM: 1. Suicide--psychology. 2. Veterans--psychology. 3. Combat Disorders--psychology. 4. Military Personnel--psychology. 5. Stress Disorders, Post-Traumatic--psychology. 6. War. WM 165 W253 2009]
HV6545.7.W37 2009
616.85'84450088355--dc22
2009025481

Published by Nova Science Publishers, Inc. ✦ New York

CONTENTS

Preface		**vii**
Part I: War, Human Behavior and Suicide		**1**
Chapter 1	Understanding Human Behavior During War *Dusica Lecic-Tosevski, Saveta Draganic-Gajic and Milica Pejovic-Milovancevic*	**3**
Chapter 2	People Act, People Make Wars, People React: Understanding Human Behavior During War *Marco Sarchiapone, Sanja Temnik, Federica Limongi and Vladimir Carli*	**17**
Chapter 3	War, Massive Social Change and Suicide *Said Shahtahmasebi*	**27**
Chapter 4	War and Depression *Amra Zalihic and Dino Zalihic*	**43**
Chapter 5	Mental Disorder, War and Suicide *Časlav Lončar and Tomislav Franić*	**57**
Chapter 6	They Also Serve Who Only Stand and Wait: Suicide in Wartime Civilian Populations *Wally Barr*	**63**
Chapter 7	The Netherlands and World War II, Jews and Suicide *Wout Ultee, Ruud Luijkx and Frank van Tubergen*	**73**
Part II: Stress and Suicide		**93**
Chapter 8	Stress and Suicidal Behavior *Eduardo J. Aguilar, Samuel G. Siris and Enrique Baca-García*	**95**
Chapter 9	Post Traumatic Stress Disorder and Suicidal Behavior *Maurizio Pompili, Alberto Forte, Enrica De Simoni, Ludovica Telesforo, David Lester, Roberto Tatarelli and Stefano Ferracuti*	**113**

Chapter 10 Medicalization of Distress: Pros and Cons **141**
Edith van't Hof and Dan J. Stein

Part III: War and Children **155**

Chapter 11 Bio-Behavioral Consequences of Traumatic Stress in Childhood and Adolescence: The Effects of War on Children's Mental Health, Growth and Development **157**
Panagiota Pervanidou, Gerasimos Kolaitis and George P. Chrousos

Chapter 12 Trauma and Posttraumatic Stress in Child Soldiers of World War II **173**
Philipp Kuwert and Harald J. Freyberger

Part IV: Physical Injury and Suicide **179**

Chapter 13 Combat Related Physical Injury and Suicidal Behavior **181**
Abel Koshy

Chapter 14 Deployment-Acquired TBI and Suicidality: Risk and Assessment **189**
Lisa A. Brenner and Beeta Y. Homaifar

Chapter 15 Preventing Suicidal Behavior After Traumatic Brain Injury **203**
Arja Mainio

Part V: Suicide in War Veterans **219**

Chapter 16 Suicide in Veterans **221**
David While and Navneet Kapur

Chapter 17 Suicidal Behavior in War Veterans **235**
Sandeep Grover

Chapter 18 The Interpersonal-Psychological Theory of Suicidal Behaviors as an Explanation of Suicide Among War Veterans **249**
Lindsey L. Monteith, Kelly L. Green and Amanda R. Mathew

Chapter 19 The Concept of Posttraumatic Mood Disorder and its Relation to Suicidal Behavior in War Veterans **265**
Leo Sher

Chapter 20 Locating Now: On Historical Trauma and the Confusion of Identity **277**
Shelly Ben David

Index **285**

PREFACE

War and violence are a part of the life of millions of people. Millions of people around the world were involved in many wars and military conflicts during the past several decades. War tremendously influences human behavior. Multiple lines of evidence suggest that war affects suicidal behavior among soldiers and civilians. There is also substantial evidence that suicide rates among war veterans are increased.

The relationship between war and suicide is perplex. Understanding the impact of war on suicidal behavior in the military, among civilians and war veterans is an important challenge for future research. We hope that this book will contribute to this goal. The contributors to this book are the leading international experts in psychiatry, suicidology and sociology. We would like to acknowledge and thank all the contributors. Our task as the editors was greatly facilitated by their swift and positive response to our initial inquiry, and thereafter by producing their manuscripts diligently. We believe that this book will be of interest to clinicians, researchers, and the general public.

We welcome comments from readers. Please, submit your comments via the website at www.internetandpsychiatry.com

Leo Sher
Alexander Vilens
April 2009

PART I: WAR, HUMAN BEHAVIOR AND SUICIDE

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 1

UNDERSTANDING HUMAN BEHAVIOR DURING WAR

Dusica Lecic-Tosevski, Saveta Draganic-Gajic and Milica Pejovic-Milovancevic
Institute of Mental Health, Belgrade, Serbia

ABSTRACT

What is war and how humans behave during war are questions which have been intriguing during the whole history of civilization. Wars and conflicts are, unfortunately, ubiquitous, have been always present in human history, and also in every day lives through media, where we are faced with their destructive power. They cause civil causalities, loss and destruction of homes, economies and infrastructures. Organized violence, such as wars, oppression by dictatorships and massive terrorist attacks are extreme cases in which hundreds or thousands of people are exposed to trauma in a short period of time. In this chapter the authors discuss theories of wars and specifities of human behavior from several different perspectives emphasizing instinctive, biological and environmental factors in understanding the phenomenon of human aggression which escalates during wars. Further on, they discuss psychosocial consequences of wars, especially on family and children, as well as the specifities of mental health professional work in war periods.

INTRODUCTION

The science and philosophy (λογος and σοφια), have not followed the enormous development of technology, and have not harmonized the world. The so-called civilized world is mortal, as Valerie declared after World War I, but it seems it is even more mortal now, since the ”malady of death” or the power of destructive forces, both outside and within the individual and society, has never appeared as dangerous as it does today.

What is war and how humans behave during war are questions which have been intriguing during the whole history of civilization. The wars lead to humiliation, destruction of material goods that are result of human culture. One cannot stop fearing that development of sophisticated technology might lead to destruction of civilization in whole. Nowadays

experience confirms that decision to start and lead wars on greater or smaller scales all around the world is in the hands of politicians and policy makers, according to the famous Aristotle's sentence that "man is a political animal", which he stated many centuries ago.

Examining the phenomenon of war in any context could begin with philosophical questions such as what is war, what is the cause of war, and what is the meaning of relationship between human nature and war. War can be defined as an all-pervasive phenomenon of the universe and its definition varies from Heraclites' decry statement that "war is the father of all things", through Hegelian philosophy in which "change can only arise out of war or violent conflict", to the actual Oxford Dictionary definition that war is"any active hostility or struggle between living beings, a conflict between opposing forces or principles" (1).

Freud's question "Why war", put in his famous letter to Eistein is even more important today. Indeed, what are the causes of the eternal spiral of violence? Freud thought that confrontation of interests among people has been always solved, or tried to be solved by forceful means (2). The rule of power and raw force leads to war which reflects a primordial state. There have always been wars which led to subjugation, and division of people to winners and slaves. In spite of so-called progress and civilization achivements, the modern man is not much different from his ancestors and is their mirror (2). Living in the world today, it is hard to determine whether aggression is innate or early acquired. The Old Testament and its laws rule the modern man, and the Cain's complex is still alive, in spite of the evolution of h. sapiens.

Freud was ambivalent about wars and even justified some of them, believing that they can create peace, like "Pax Romana" introduced by Roman invasion of Mediterranean countries (2). But, he lived before Hiroshima and Holocaust and modern terrorism. It seems that today many politicians lead wars with this unacceptable excuse. Unfortunately, mass violence is ubiquitous, always present in human history, and today more than ever present in every day lives through the mass media, where we are continuously faced with violence and its destructive power.

Are we the victims of Freud's coercion of repetition, which serves Thanatos, the death drive? Sometimes it seems that we live in the past, not the present. Psychoanalysts dealing with the problems of trauma today speak of the tunnel syndrome, often with no way out. Some would not agree with that, believing in the spiritual evolution of man.

WARS ON THE WORLD MAP

About fifty countries and one billion people are affected by mass violence nowadays. Epidemiological data show that ninety per cent of an estimated 101 million war deaths that have occurred since 1700 AD happened in the XX century and more than 70% of these deaths have been civilians (3). According to the WHO Report on Violence and Health, 14% of male deaths and 7% of female ones are the result of violence (4).

Most strategic analysts agree that in the second half of the XX century, contemporary wars are less a problem of relations between states than a problem within states (5). From direct fighting between countries for territory or conquest of land, conflicts have increasingly

become internal, within countries, involving ethnic and other civil groups against each other (6).

Organized violence, such as wars, oppression by dictatorships and massive terrorist attacks are extreme cases in which hundreds or thousands of people are exposed to trauma in a short period of time. Although the symptoms of psychosocial consequences of war may be similar, the social contexts in which individual victimization and exposure to organized violence happen are different and have to be understood. The social milieu in which the survivors of individual trauma and survivors of mass trauma are embedded is likewise different. It is very important because understanding the social context of the trauma helps create the right social intervention for recovery and healing at social and personal levels (7).

Most of the wars break up suddenly and unexpectedly. They are merciless, brutal, accompanied by wide range of destruction, great number of human casualties and wounded people with perspectives of permanent disability. Some of the most disturbing are wars with inner, ethnic character of the conflict where the people of different nationalities and confessions were living closely connected for a long time before wars. Wars affect a large number of individuals, result in mental health problems (8) and cause large movements of people. Nowadays the international community faces a global refugee problem of unprecedented proportions. It is estimated that there are close to 20 million refugees and 20 million displaced persons. For a large proportion of those forced to migrate, the relocation process itself is often associated with degradation, poverty, violence, dehumanization, torture or death (9).

CAUSES OF WAR

According to various theories, understanding of causes and nature of wars may be divided into three main domains: 1) war as something inherited in human's biology; 2) war as a consequence of culture diversity, and 3) war as a product of different reasons (or, maybe, lack of them) (10). However, it seems that different domains probably overlap because it is well known that human biology can affect cognition and accordingly the cultural development, and in turn, cultural development of a person or society in general can affect biological development. Kenneth Waltz, in his book "Man, War, and State", argues that "while human nature no doubt plays a role in bringing about war, it cannot by itself explain both war and peace, except by the simple statement that sometimes he fights and sometimes he does not" (10). There is a belief that war and violence are intrinsic to human nature, but this may not be a case (11, 12).

The idea that war is intrinsic to human nature has a long tradition incorporated into Christian doctrine that „the inclination of man's heart is evil from childhood"(Genesis 8.21). Trying to understand specifities of human behavior during war, especially escalation of aggressive and cruel behavior which almost always happen, it should be remembered that human decision-making system is basically governed by two neural systems - the deliberative and the affective one (13). It is well known that intense emotions can undermine a person's capacity for rational decision-making, even when individual is aware of the need to make careful decisions. When people are angry, afraid or in some other intense emotional states, as they always are during war, they tend to favor symbolic, viscerally satisfying solutions to

problems, more then behave in realistic and effective way. Maybe because of that, Lobel stated that war is the quintessential issue where immediate emotions and passions hold sway, often at the expense of an evaluation of long term consequences (13). Cruelty, which frequently accompanies human behavior during war conflicts, is a deliberate infliction of physical or psychological pain on other living creatures, sometimes indifferently, but often with the feeling of delight. Studies confirm that cruelty in war show the historical and cross-cultural stability of its uses for punishment, amusement, and social control (14). Although cruelty is, unfortunately, overwhelmingly present in the world, there is yet no neurobiological or psychological explanation for its ubiquity and reward value.

Further on, we will try to examine how different theories view aggression, that most people consider dark side of human behavior, because it is a core of human behavior during war conflicts.

AGGRESSION

Several definitions of aggression have been offered by psychologists. The simplest is a behavioral one that defines aggression solely in terms of a behavior and its consequences, without considering the motives of the actor (15). According to this definition, aggression is an action that produces harm or injury to another person, either physical or psychological. What follows are major perspectives explaining aggression, including instinctive, biological and environmental factors (16).

The view of human nature as basically savage is not new. In the XVII century, social philosopher Thomas Hobbes professed a pessimistic view of human constitutional nature. He contended that „life is solitary, poor, nasty, brutish and short“ and he felt that unconstrained human nature would selfishly exploit and harm others (16). Humans would exterminate themselves were it not for organized societies, which act as external control to keep people in line. The basic view that aggression is part of human nature is represented in various psychological theories.

Freud believed that aggression is instinctive (17). In his works and in his famous letters to Albert Einstein (2), he tried to explain how nineteenth-century European civilization had so easily succumbed during war. During World War I, Freud was both intrigued and depressed by the organized human destruction. His letters written to Einstein are an ideal starting point for a discussion of aggression because they focus on the nature of large-scale conflicts among humans (18).

Freud had always believed that civilization was tenuously built on the shaky foundations of man’s primordial drives. He could not understand how killing could fit into his view of human nature if people were motivated by Eros alone. Disappointed by man’s character Freud introduced the concept of Thanatos, the self-destructive death drive, which relates with Nietzsche’s claim on the eternal repetition as opposed to Eros, or sexual drive, from Plato’s Symposion (17). In his book „Civilization and Its Discontents“ Freud concluded that death drive functions in every living being and becomes an impulse to destruction when it directs its action outward, against external objects (19). Although increasingly subdued by the advance of civilization, the death instinct is always liable to break through and is never likely to be totally suppressed. Freud`s pessimistic view of human nature essentially holds that nothing

can alter human basic level of aggression, since this level is innate in human nature. In his letter to Einstein, Freud wrote „here is then the biological justification for all those vile, pernicious propensities which we are now combating. They are really more akin to nature than is our stand against them, which, in fact, remains to be accounted for“ (2). Freud tried to give biological and even evolutionary support to his claim, in order to explain why this was so. It looks as if he was imprisoned in one more conflict - the conflict of Freud as a theorist against Freud as a humanist. As a theorist he concluded that man can chose between two possible solutions – destruction of himself or destruction of others, in other words, between assigned sacrifice toward himself or others. As a humanist he was struggling against the idea of such a tragic selection that will create war as a rational solution of this particular way of human existence. In that sense Freud concluded that “if the propensity for war be due to the destructive instinct, we have always its counter-agent, Eros, at our hand that produces ties of sentiment between men which must serve us as wars antidote“ (2).

Somewhat similar to Freud’s viewpoint, in relation to the possible perspectives of opposing human aggressiveness as part of human nature, was brought forward by Victor Frankl, famous logotherapist, as he was confronted with the tragic experience of surviving the Auschwitz experience during the World War II. Frankl was convinced that the gist of survival, even in the most tragic life circumstances, is in the meaning which is usually in „fulfilling or meeting another person, in other words in some reason which needs to be met or in a person you love“ (20). Furthermore, he assumed that with the possibility of ascertaining the meaning, the human nature becomes less aggressive.

A sophisticated variant of the aggression as a part of the human nature had been offered by Konrad Lorentz, the ethologist. In his famous book „On aggression“Lorentz stated that aggression is produced by instinctive (innate) energies (21). An innate response is not learned but rather derives from one’s biological heritage. Konrad Lorentz alerts us to the behavioral differences between intra-species and inter-species aggression, as well as to the role of reutilization, ranking and dominance-submission patterns in inhibiting aggression. How human collectivities conceptualize self and others, how they define identities and exclude specific others from their surrounding, has a profound influence on who they might be inclined to combat violently (21). Lorenz opposed humans who regularly kill each other in fighting to all other animal species, since humans are almost unique in the animal kingdom in having no inhibiting mechanisms against killing other humans. „While we are intelligent enough to have created weapons system capable of exterminating all life on planet, yet we lack the now necessary inhibiting instincts that evolution warranted unnecessary“ (21). Human violence appears unique and Lorenz suggested that in evolutionary terms human weapons, and hence lethality, developed too recently and too fast for the mechanisms of intraspecific restraint to catch up. The idea that „we are the most ruthless species that has ever marched the earth “became world widely accepted. Lorentz stated that instinct serving animals for survival, in humans becomes „grotesque, enlarged and wild.....aggression transforms into threat, and does not help the preservation“ (21).

ANTHROPOLOGY OF VIOLENCE

It is clear that theories concerning aggressive instincts are not sufficient to explain the complex phenomenon of human behavior during wars and to give an answer why wars occur. Probably the existence of aggressive instincts was the simplest and easiest explanation to understand. There is a serious risk that some theories could be misused to rationalize crimes and wars, and to absolve people from responsibility. In 1912, the German general von Bernhardi stated that „war is a biological necessity....it is as necessary as the struggle of the elements in nature...it gives a biologically just decision, since its decisions rest on the very nature of things“ (16).

The number of scientists, anthropologists above all, objected to the biological determinism. Anthropological investigations have shown that instinctive interpretation of human destructiveness is not justified. Margaret Mead in her article „Warfare is only an invention, not a biological necessity“ (22), pointed out that some societies fought whereas others did not. Von Clausewitz defined war as “an act of violence intended to compel our opponents to fulfill our will”, and elsewhere he emphasized the continuity of violence with other political methods: “War is nothing but a continuation of political intercourse, with a mixture of other means” (23).

In the book „ A Study of War“, which contains analysis of warfare among the aboriginal people based on the statistical comparison of data on 653 aboriginal communities, Wright concluded that the most aboriginal people are at the same time the least militant and that the militancy proportionally increases with the development of civilization (24). The author stated that if the destructiveness in the person was innate, this connection would have been vice versa. Similarly, Ruth Benedict (25) believed that it is completely wrong to attribute destruction and war to the biological need of the person for warfare since „the man is himself the author of that destruction“.

In his famous book „The Anatomy of Human Destructiveness“ Erich Fromm discussed two forms of aggression - the benign and malignant one (26). Benign aggression is defensive, unavoidable for survival, biologically adaptable and vanishes when the cause stops. The malignant aggression, or destructivity and cruelty, is characteristic of the man, it is not philogentically programmed and biologically adaptable. Fromm believed that this particular form of aggression does not have any sense and its content finds out in greed. The difference between these two forms of aggression needs differentiation, with assumption that malignant aggression is based in human character, especially sadism and necrophilia. Analyzing the characters of Hitler, Himmler and Stalin, Fromm discussed the role and function of malignant aggression in wars.

SOCIAL PHENOMENA

Wars could also be seen as social violence. Erik Erikson, for example, employed the negative identity and totalism in analyzing the social phenomenon of war (27). It seems that psychological theories have now come to the same view, maintaining that aggressive behavior, although potentially innate, develops by social learning. Social-psychological positions on aggression have stressed how environmental frustration, social learning and

necessity to influence others account for a wide variety of aggressive behaviors (16). This is supported by brain research, which shows that brain design is flexible, especially in the early stages of life. It extensively rearranges itself, creating new neuron circuits in response to changing environmental challenges. Individuals, groups and societies are conditioned to become more or less violent by the sort of environment to which they have been exposed - young people growing in violent social circumstances become violent; abused children become the abusive parents, and so on. History shows that some societies became more bellicose, whereas others were more pacific (16).

Discussing the phenomenon of war, it is important to mention the religious violence. It could be defined as a violence of a sustained, recurrent and reasonable organized nature which is represented, usually by way of justification or advocacy, in religious symbols or as violence inflicted under the auspices of the sacred (28). Sacralised violence possesses an unconditional claim to legitimacy in the eyes of its perpetrators. Individuals from many religious groups have been willing to die for their cause, but despite this religion is rarely the root cause of violence attacks, such as in suicide terrorism. Erich Fromm also emphasized the importance of disregarding the spiritual, religious meaning and the motivation of the destructive and cruel doings (26). He believed that once the war breaks out (for various reasons), it becomes a „religious phenomenon“, whereby the country, the nation and the national pride become some kind of an idol whose power becomes stronger than the power of love and for whom people are „ready“ to kill and be killed. On the contrary, Rene Girard, French Canadian, who has written about the relationship between group violence, law, sacrifice, religion and culture, argues that it is not religion that is the cause of violence, not even the fundamentalist religion, but rather the breakdown of the boundaries established through religion and the law that results in the release of violence (29).

BORDERLINE CULTURE

Contemporary psychoanalytic theory is seeking to embrace neurological, developmental and phylogenetic dimensions in order to explain dynamic reactions between primitive impulses and symbolizations in the human personality and behaviors responsible to war.

The intriguing question is whether personality disorders might be linked with the growing violence and whether the modern culture, with tendency towards globalization and creation of a new Babylon, favors regression to primitive levels of functioning and development of borderline personalities, prone to fragmentation, affective and cognitive disorders. There is no doubt that the splitting, a primitive defense mechanism, takes important place during conflicts and divides people in either good or bad categories.

And indeed, some authors think that social crisis can cause development of personality disorders. Does new war technology (invisible „heroes“, computer targets), favors participation in violent acts? Milgram’s (30) famous experiment indicates how uncritical obedience to authority may easily bring about guiltless participation in sadistic behavior even at high levels of psychological organization and in an atmosphere of social freedom. That severe and chronic criminality can be facilitated by social influences was shown in Dicks’ book “Licensed Mass Murder” (31). Describing Nazi crimes Dicks concluded that some individuals engaged in most repugnant criminal behavior in the context of social facilitation

of the SS training and death camps, reverted to their previous, non-delinquent personality functioning during and after their prison terms.

Some authors have raised an interesting hypothesis that personality disorders are not psychopathological entities but merely socio-cultural phenomena related to contemporary Western "culture of narcissism". This "me culture" insists on success and power, and is characterized by a collective diffuse identity and a loss of traditional values, love, religion, and spirituality (32).

Trying to understand human behavior during war, we have to mention the forensic perspective and its contribution to better understanding of personalities prone to mass violence and aggression. Some studies argue that motivation for mass violence and terrorism could be grouped into several categories: a very personal way to interpret cultural and historical experiences; maintenance of personal and group membership with friends that had joined terrorist group; a wish to gain notoriety and personal status; and adoption of an ideology that rationalizes and justifies the use of violence to obtain the ends of the group (33). Some authors believe that six psychological types are more prone to use weapon of mass destruction: paranoid, paranoid schizophrenics, borderline and passive-aggressive personalities and sociopaths (33). Hacker also supported the idea of terrorists as mentally ill persons, considering that they could be included into one of the following three categories: idealists or crusaders, criminals and mentally ill (34). Contrary to this, Hudson points out that „terrorist are made, not born" (35) arguing that some psychological explanations such as frustration-aggression, negative identity and narcissistic rage could be more important than personality type. We assume that the context in which the violence occurs is very important for better understanding the phenomenon of mass violence. As it was stated in some studies, person who becomes terrorist may not have any mental pathology, but may eventually display „terror-pathology", when fanatic or overly determined ideas override other considerations (33).

It is clear that social disintegration can cause episodic antisocial behavior, reflecting a normal adaptation to an abnormal social environment. However, taking into account a multifactorial origin of personality disorders and their early origin and manifestations, they most probably cannot be attributed to cultural conflicts and social determinants. But, the question whether modern age favors development of personality disorders and their greater prevalence, still remains open. It might be that new age just favors the expression of personality disorders and not their prevalence, which might have been the same in all the cultures.

PSYCHOSOCIAL CONSEQUENCES OF WAR

Man-made disasters cause the spiral of stress, many disorders and illnesses, low quality of life and initiate the vicious circle of problems. There is sufficient evidence from the variety of mass violence/conflict situations, that a significant proportion of the exposed population develops different mental disorders.

Our studies have shown that war can have a distressing effect on mental health of the affected population as a whole, especially in the vulnerable groups such as children, adolescents, single mothers, elderly, refugees and detained people (36, 37, 38). Psychosocial

consequences are frequent and manifest as stress disorders, depression, psychosomatic illnesses, aggression and violence among the young, substance abuse, suicide, complicated bereavement reactions, and arrest of childhood developmental progression. The burnout syndrome among professionals is also frequent during wars. Our findings have shown that there was a significant gender difference - female general practitioners had higher emotional exhaustion than male (39). Most of women professionals are under significant strain since the well known double female role gets an additional, third component - in initiating and leading programs for refugees and other vulnerable groups under prolonged stress of war. Limited resources, as well as sharing difficult destiny with their patients are other factors causing burnout syndrome which is frequent among female doctors with multiple roles.

A substantial proportion of refugees experience post-traumatic stress reaction after adversities (36, 37). Studying refugee population we found that posttraumatic stress disorder (PTSD) was manifest in 29.2% of them, with the highest prevalence among those who experienced sexual abuse (56%) and severe forms of torture during detention (74.8%) (37).

War effects on mental health and human behavior has been frequently addressed and most studies were focused on establishing the extent of damage to mental health in the civilian population which suffers 95% of the causality (40). Studying the consequences of bombardment one year after air attacks, we found that a significant number of civilians (11%) had psychological symptoms of posttraumatic stress, such as intrusion and avoidance (41).

FAMILY AND CHILDREN

Violence during wars affects multiple dimensions of family life. Family is forced to change in several domains - in family roles and obligations, memories and communications, in relationships with other members, as well as in connections with the ethnic community and national identification. Key processes in coping with stressful situations are the following: finding meaning of adversity through specific family belief systems, promoting family organizational patterns (flexibility and connectedness) and communication/problem solving processes (clarity, emotional expression and collaborative problem solving). Faced to external stress such as war, families are forced to change their adaptability potentials, while, at the same time, they have to maintain their stability (42).

War experience is frequently connected with experience of separation and process of mourning. Bowlby has shown that humans are genetically predisposed to want access or proximity to an attachment figure and that this behavior is triggered by fear (43). The same feelings of fear and an accompanying sense of helplessness are inherent to the experience of psychological traumatization during wars. If people experience severe war trauma, they can feel helplessness and humiliation, in addition to a loss of capacity to empathize and to put them in the mind of the “other” who is thereby dehumanized, which predisposes one to acts of violence (11).

It is important to raise awareness of how children may understand, interpret, and respond to related fears and concerns (44). Wars prevent normal development of children leaving scars on their psyche and may result in future personality disorders as well as a predisposition to adult mental disorders.

According to the UNICEF data, 80% percent of war victims are women and children. For children and youth living in war area various threats represent ordinary life such as constant threat of terrorist attacks, temporary shooting, injuries of family members, prolonged fear, and impossibility of regular school activity. There is a growing number of evidence suggesting that traumatic experiences in childhood have long term effects on child's emotional, behavioral and cognitive development as well as child's personality (45).

Mental health of children and adolescents is severely affected by war, economic sanctions or isolation. Our experiences from the period of wars during 1992-1999 in Former Yugoslavia indicated an increase of psychological and behavioral disorders in adolescents, abuse of psychoactive substances, peer violence, joining different gangs as well as nihilistic, aggressive or hedonistic attitude towards the world and the future (46, 47). Fortunately, two thirds of young people who experienced serious traumatic events have not developed any manifest psychopathology.

During war a young person's preexisting "conceptual maps" are no longer adequate and even the mechanisms for developing new "maps" are often damaged or destroyed. The breakdown of family and connection with relatives and friends, the absence from school, breakdown of a social network, represent destruction of mechanisms which provide the adolescent with norms and context for the interpretation and understanding of traumatic events. Those at greatest risk for the occurrence of lasting negative effects are children and young people who had been exposed to multiple traumatic experience, without adequate parental support; children who lost family members or friends; young people who live in collective refugee centers; those who experienced loss in early childhood and those previously suffering from somatic or mental disorders (46, 47).

Children and young people are exposed to war violence in a variety of ways with a wide range of consequences. They could be direct victims of war, indirect victims (as a consequence of the effects that violence has on caring adults) and as perpetrators of violence. The phenomenon of child soldiers is of a special importance (48).

In addition to severity and the number of traumatic experiences the outcome of trauma exposure in children may vary by individual characteristics (maturity, cognitive style, self-esteem, quality of previous experiences), parental support and attitude of social environment (46). The prevalent attitude and cohesion of the community, with a belief that war is justifiable can mitigate the negative effects of war on the young people (49).

MENTAL HEALTH PROFESSION

Organizing mental health services in conflict and in post-conflict situations requires many skills and complex work across sectors. Experiences of some countries show that dealing with the consequences of wars is a great challenge to mental health professionals whose work often has to be outside their traditional roles (8). Understanding mass violence from public mental health perspective provides framework for curriculum that covers treatment for individuals and interventions for the whole population as well as exploring the mental condition and social relationships which promote peace (50).

Wars at the beginning of XX century changed psychiatric history – they stimulated the analysis of the effectiveness of psychological interventions, supported setting up of

specialized institutions around the world and opened up new ways of understanding psychological reactions to stress (6). Because of that, the World Psychiatric Association (WPA) views violence as a major public health problem with important mental health implications (51). Recently WPA and WHO agreed upon WHO-WPA work plan for the period 2008-2011 as well as upon partnership on mental health care in emergencies with the aim to prevent and manage the mental health and psychosocial consequences of disasters and conflicts, with the participation of professionals from various regions (52).

Understanding a complex and evolving set of causes and effects surrounding wars is a considerable challenge to the international humanitarian field, as well as to mental health professionals (53). In recent years there has been an increasing interest in the psychological impact of the atrocities of war, and programs aimed at addressing psychological trauma should be priority during wars and in postwar settings. However, most organizations, both governmental and nongovernmental, predominantly deal with the psychosocial consequences of trauma, instead of dealing with prevention of wars and violence. But, the question is whether prevention of causes instead of consequences is possible or utopian goal? We believe that it is not utopian and that prevention of violence should be an important role and a challenging task for the future of psychiatry, including the agenda for developing programs for conflict resolution, reconciliation, increasing inter-ethnic and religious tolerance as well as promoting peace and nonviolence. The opportunity provided by our field is also to develop a better understanding of issues of resilience, recovery and effectiveness of public health approach to mental health care (54). It seems that the prevailing Western individualistic attitude is neglecting the core issue - the role of a social world, invariably targeted in wars and yet still embodying the capacity of survivor populations to manage their suffering, adapt and recover on a collective basis (53).

The research of trauma is also significant in restoring peace and reconciliation, since it has a universal language. We think that professionals should attempt to investigate the complex chain of interactions between personality, environment and behavior initiated by trauma. Also, they should work to prevent the maintenance of malignant memories and their pernicious effects in traumatized people, such as lasting scars on the psyche and personality changes. The final aim would be to prevent transgenerational transmission of trauma, which has been a locus communis in many regions of the world.

WHY WAR, AGAIN?

The contemporary world is continuing to write its book of dead. Every day the civilians are dying due to hostilities, or facing consequences such as extreme poverty.

Freud claimed that disasters of all kinds, and unfortunately wars are inevitable, in spite of the so called civilized and developed world, since man is much better in destroying than in creating, for the greatest part of him like an iceberg, is submerged in a destructive element (2). Therefore, man-made disasters, such as wars, are likely to continue in the foreseeable future. However, we do believe that as humanists we should never stop asking the ultimate question “Why war?” from the famous Einstein and Freud’s correspondence. Freud thought that the only way against destruction is development of culture, introjection of aggression, and dictatorship of mind, as a defense against man’s aggressive drives (2).

A global awareness should be raised and psychiatrists should not be locked in their hermetic circles but should raise their voice against war and terrorism, no matter how effective and of limited impact this voice can be. In addition to that, as intellectuals and pacifists we should feel resistance towards "sound and fury" of wars and destruction in all their aspects. We should express the constitutional intolerance since terrors of wars are accompanied by their esthetical lowness, as Freud claimed. And we should „feel ashamed with our Anima Christiana" (2) of being contemporaries of the continuous cold and malignant world game.

At the end we would agree with the statement of Bowis who said: "The whole aim of prevention of mass violence is perhaps effective action and catharsis…. Catharsis was Aristotle's concept for the Greek theatre and it meant the process of restoring, revitalizing and cleansing by enabling us to share the overwhelming emotions of pity or sorrow that were the climax of the theatrical tragedy. Mass violence was often the underlying theme of Greek tragedy, it is too often the theme of today's news coverage. Governments and mental health professionals need to work cooperatively to ensure the needs of the players and audiences of such tragedies are met" (55), and help them lead their lives as a meaningful tale.

REFERENCES

[1] Trumble W, Brown L. *Shorter Oxford English Dictionary*, Fifth Edition. Oxford University Press, 2002.

[2] Freud S. *Why War? Standard Edition of the Complete Psychological Works of Sigmund Freud. Vol. 22.* New Introductory Lectures on Psycho-Analysis and Other Works (1932-1936). Edited by Strachey J. London: Hogarth Press, 1933.

[3] Sicard RL. *World Military and Social Expenditures*, 1978-1988. Washington DC: World Priorities, 1998.

[4] WHO. *World Report on Violence and Health: Summary. Geneva,* World Health Organization, 2002.

[5] Pedersen D. Political violence, ethnic conflict and contemporary wars: broad implications for health and social well-being. *Soc Sci Med* 2002; 55(2):175-190.

[6] Somasundaram D. The tragedy of war. *World Psychiatry* 2006; 5(1):36-38.

[7] Ajdukovic D. Social context of trauma and healing. *Med Confl Surviv* 2004; 20(2):120-135.

[8] Lecic-Tosevski D, Draganic-Gajic S. *The Serbian experience, in Disasters and Mental Health*. Edited by Lopez-Ibor JJ, Christodoulou G, Maj M, Sartorius N, Okasha A. John Wiley & Sons, 2004, pp. 247-255.

[9] Marsella AJ. *Amidst Peril and Pain.* The Mental Well-being of the World's Refugees. Washington DC: American Psychiatric Association.

[10] Waltz KN. *Man, the State and War*. Columbia University Press, 2001.

[11] Zulueta, de F. *From Pain to Violence - The Roots of Human Destructiveness* (2nd ed). Chichester: John Wiley and Sons, Ltd, 1993.

[12] Zulueta, de F. Terror breeds terrorists. *Med Confl Surviv* 2006; 22:13-25.

[13] Lobel J, Loewenstein G. *Emote control: The substitution of symbol for substance in foreign policy and international law***.** Chicago Kent Law Review 2005; 80(3):1045-1090.
[14] Nell V. Cruelty's rewards: the gratifications of perpetrators and spectators. *Behave Brain Sci* 2006; 29(3):211-224.
[15] Buss AH. *The Psychology of Aggression.* Willey, New York, 1961.
[16] Severy LJ, Brigham JC, Schlenker BR. *A Contemporary Introduction to Social Psychology.* McGraw-Hill Book Company, New York, St. Louis, San Francisco, 1976.
[17] Freud S. *Beyond the Pleasure Principe. Standard Edition of the Complete Psychological Works of Sigmund Freud.* Vol. XVIII Beyond the Pleasure Principle, Group Psychology and Other Works (1920-1922). Edited by Strachey J. London: Hogarth Press, 1933.
[18] Dunn DS. Perspectives on Human Aggression: Writing to Einstein and Freud on "Why War?" *Teach Psychol* 1992; 19 (2): 112-114.
[19] Freud S. *Civilization and Its Discontents*. Standard Edition of the Complete Psychological Works of Sigmund Freud. Vol. XXI. The Future of an Illusion, Civilization and its Discontents and Other Works (1927-1931). Edited by Strachey J. London: Hogarth Press, 1933.
[20] Frankl V. *The Unheard Cry for Meaning*. Simon and Schustler, New York, 1978.
[21] Lorenz K. *On Aggression.* London, Methuen, 1966.
[22] Mead M. *Warfare is only an invention - not a biological necessity*. (*Asia*, 1940) In Anthropologists in the Public Sphere: Speaking Out on War, Peace, and American Power. Edited by González RJ. University of Texas Press, 2004, pp. 26-34.
[23] Von Clausewitz. *On War.* Baltimore: Penguin Books, 1968.
[24] Wright Q. *A Study of War*. Chicago Press, Chicago, 1965.
[25] Benedict R. *Patterns of Culture*. Houghton Mifflin Harcourt, Boston, 2005
[26] From E. *The Anatomy of Human Destructiveness.* Holt, Rinehart, and Winston, Canada, 1973.
[27] Erikson E. *Identitiy and the Life Cycle*.W.W. Norton & Company, Inc, 1994.
[28] Esmail A. Toward a psycho-anthropological view of religious violence. *Int Rev Psychiatr*y 2007; 19(3): 243-251.
[29] Girard R. *Violence and the sacred.* The Johns Hopkins University Press, Baltimore, 1977.
[30] Milgram S. Behavioral Study of Obedience*. J Abnormal Soc Psychol* 1963; 67:371–378.
[31] Dicks HV. *Licensed Mass Murder - A Socio Psychological Study of Some S.S. Killers.* Basic Books Inc, 1972.
[32] Lasch C: *The Culture of Narcissism. American Life in an Age of Diminishing Expectations.* W.W. Norton: London, 1979.
[33] Alonso-Fernandez F. *Psychologia del terrorismo.* Madrid: Masson-Salvat Medicina, 1994, p.2.
[34] Hacker F. Crazies, Criminals and Crusaders. New York: Norton, 1976.
[35] Hudson RA. *The sociology and psychology of terrorism: Who becomes a terrorist and why?* Washington: The Library of Congress, 1999.
[36] Kalicanin P, Bukelic J, Ispanovic-Radojkovic V, Lecic Tosevski D. *The Stresses of War.* Institute for Mental Health, Belgrade, 1993.

[37] Lecic-Tosevski D, Draganic S, Jovic V, Ilic Z, Drakulic B, Bokonjic S. *Posttraumatic stress disorder and its relationship with personality dimensions*. In Issues in Psychiatric Prevention. Edited by Christodoulou GN, Lecic-Tosevski D, Kontaxakis V. Karger, Basel, 1999, pp.95-102.

[38] Ilic Z, Lecic-Tosevski D. Posttraumatic stress disorder among prisoners of war. *Psychiatry Today* 1998; 30:87-106.

[39] Lecic Tosevski D, Pejovic Milovancevic M, Pejuskovic B, Deusic Popovic S, Hoftvedt BO, Tanovic Mikulec E. Burnout syndrome of general practitioners in postwar period. *Epidemiol Psichiatr Soc* 2006; 307-310.

[40] Murthy RS, Lakshminarayana R. Mental health consequences of war: a brief review of research findings. *World Psychiatry* 2006; 5: 25-30.

[41] Lecic-Tosevski D, Gavrilovic J, Knezevic G, Priebe S. Personality factors and posttraumatic stress: association in civilians one year after air attacks. *J Person Disord* 2003; 17: 537-549.

[42] Falsh F. *Family resilience: Strengths forged through adversity*. In: Normal Family Processes: Growing Diversity and Complexity. Edited by Walsh F. The Guilford Press, New York, London, 2003, pp. 399-423.

[43] Bowlby J. *The Making and Breaking of Affectional Bonds*. London: Tavistock Publications, 1979.

[44] De Ranieri JT, Clements PT, Clark K, Kuhn DW, Manno MS. War, terrorism and children. *J Sch Nurs* 2004; 20(2):69-75.

[45] Pynoos R. *Traumatic stress and developmental psychopathology in children and adolescents.* In American Psychiatric Press Review of Psychiatry. Edited by Oldham JM, Riba MB . American Psychiatric Press, Washington D.C 1993, pp. 205-238.

[46] Ispanovic V. *Growing up in communities affected by war*. In Promoting the Psychosocial Well Being of Children Following War and Terrorism. Edited by Friedman MJ and Mikus-Kos A. IOS Press, 2005, pp.171-177.

[47] Bojanin S, Ispanovic Radojkovic V. *Adolescents and the Stress of War*. In The Stresses of War and Sanctions. Edited by Kalicanin P, Bukelic J, Ispanovic Radojkovic V, Lecic-Tosevski D. Institute of Mental Health, Belgrade, 1993, pp.89-106.

[48] Moghadam A. Suicide terrorism, occupation and the globalization of the martyrdom: a critique of Dying in Win. *Studies in Conflict and Terrorism* 2006; 29: 707-729.

[49] Ispanovic Radojkovic V. Youth clubs: psychosocial intervention with young refugees. *Intervention* 2003; 1(3):38-44.

[50] Piashaud J. Mass violence and mental health / training implications. *Int Rev Psychiatry* 2007; 19(3):303-311.

[51] Okasha A. Mental health and violence. *Int J Psychiatry* 2007; 19(3):193-200.

[52] *http://www.wpanet.org/news/e-bulletin/68-wpa-e-bulletin.shtml*

[53] Summerfield D. The social, cultural and political dimensions of contemporary war. *Med Confl Surviv* 1997; 13(1):3-25.

[54] Murthy RS. Mass violence and mental health – recent epidemiological findings. *Int J Psychiatry* 2007; 9(3):183-192.

[55] Bowis J. Mass violence and mental health. *Int J Psychiatry* 2007; 19(3): 297-301.

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 2

PEOPLE ACT, PEOPLE MAKE WARS, PEOPLE REACT: UNDERSTANDING HUMAN BEHAVIOR DURING WAR

Marco Sarchiapone[1], Sanja Temnik[2], Federica Limongi[3], and Vladimir Carli[3]

[1]University of Molise, Campobasso, Italy;
[2]University of Primorska, Koper, Slovenia;
[3]Leonardo Foundation for Medical Science, General Hospital, Abano Terme, Italy

ABSTRACT

Wars have been, and they remain, a companion of humankind throughout the history. Every war means an adverse experience, which dramatically reaches into the life of every affected individual, as well as society as a whole, and inevitably, without compromise, demands adjustment to the new environmental conditions, which are colored by uncertainty, unpredictability and fear. During a war, the dynamics of human psychosocial functioning, including our behavior patterns, change profoundly, as one of the most basic human needs, the need for a structured environment, is left unsatisfied. This evokes feelings of pronounced anxiety and helplessness, which might, if they are intense enough, lead to long-term psychological damage, either in the form of mental disorder or prolonged personality change. In this chapter, we provide an overview of evidence for different determinants of human behavior during war-time and in the post-war era, the identification of which enables a holistic outlook on the acts of people, affected and driven by war-circumstances. We devote special focus to the effects of war on one of the most vulnerable population groups, when it comes to long-term detrimental effects of war, the children. With this chapter, we hope to contribute a few pieces into the puzzle of behavioral dynamics in the shadow of war-related (di)stress.

1. INTRODUCTION: AS WAR CHANGES, A MAN CHANGES

It was the poet and author Eve Merriam who had said, that she dreams of giving birth to a child that will be able to ask: 'Mother, what *was* war?' Since Ms. Merriam died in 1992, she

did not live long enough to see such an era. Wars have been and remain a constant companion of humans throughout the history, and nothing seems to indicate, that a time, free of armed conflict, would soon become reality.

Wars may very well be the most realistic mirrors of the so-called 'dark side' of human nature, and the fearful reactions they evoke, might be that frightening because they mirror the cruelty within us in the most explicit and honest way possible. We can define war as an *adverse life experience, which always affects society as a whole, as well as every individual separately and in his or her own very particular way, depending on the individual's personality, present life conditions and previous life experiences.* During war, life conditions dramatically change, and this change requires a fast and efficient adaptation to the new, disadvantageous environmental circumstances. This adaptive process might be easier achieved by some, and more difficult to do by the others, who are therefore more prone to suffer long-term negative effects of war-time. One could say that the cognition of societies and individuals slowly changes during longer conflicts [1]. This cognitive change can be of short- (reversible) or long-term (irreversible) nature.

In order to clarify the phenomenon of war at least to a certain degree, Brown [2] has suggested, that the domestication of humans leads to the repression of aggression, which is involved in the struggle for security, profit, power, and sex objects, and affection. These are often displaced onto such secondary goals as hate of the enemy and love of the fatherland, and this process is furthered through projection and rationalization. Socialization leads through group symbols and stereotypes to affection for in-groups and aggression toward out-groups. The antagonisms become accentuated during times of conflict, particularly when nations (dominant social groups) are involved [2]. Armed conflicts between nations in war can therefore be understood as the most severe expressions of inter-group hostility.

Rudmin [3] has pointed out, that war is not a universal human behavior and, therefore, not innately psychological. On this basis, if we aim for psychological studies of war, our studies must be inevitably set in the social and cultural contexts, in which war behaviors must readily appear. The author performed a cross-correlation of various holocultural data bases, in order to identify cultural traits and social institutions that co-occur with frequent warfare. The results most strongly supported the *tendency of war to be absent from hunting societies, and present in pastoral and agricultural societies, which are structured on social classes and slavery.* According to these findings, societal organizations play one of the crucial roles in war-dynamics, which might quite well explain the war-situation(s) in the contemporary world, where competition is one of the major driving forces, as well as from the standpoint of the individual, as in the wider public schema of our societies.

The effects of war have even been compared to those of an organic dysfunction [4]. As is the case in experimentally neurotic animals, man is unable to distinguish right from wrong in times of severe stress, because of the too close approximation of the affecto-symbolic stimuli offered him. Thus, his behavior becomes disorganized, so that he becomes a victim of a so-called 'social neurosis'. The author explains that in the wider purview of phylobiology, the conflict betwen the conditioned ideology of the Axis powers and that of the Democracies is but the *social extension of the right and wrong dichotomy of motivation, existing in each of us as partitively systematized personalities.*

Fear seems to be effective in creating changes in cognitions and/or behaviors, especially at moderate levels of extraneous arousal, but high levels of arousal eliminate or reverse the effects [5]. War usually leaves long-lasting consequences behind, which do not only affect the

war generation itself, but post-war ones, as well. Miksaj-Todorovic and Singer [6] assessed these generational differences in their study and found, that the number of sanctioned juveniles during the post-war period significantly reduced in relation to the pre-war period, which they explained by the well-elaborated post-war policy of solving the problems of upbringing and family relation out of the court. Statistically significant differences have been found between the above mentioned two groups, with the *post-war generation showing a significantly `harder` profile, exhibiting more violent offenses, higher levels of recidivism, asocial behaviors, addictions and problems in the educational process.* A reform of the principles of the institutions which are conducting correctional measures and the sanction of juvenile prison might therefore be justified, although it is still a commonly overlooked issue, with adjustment in tact with the post-war conditions, instead of a rigid clinging to to pre-war organization structure(s) in these facilities.

In persons, exposed to war-trauma, the following psychiatric disorders frequently appear [7]:

- ✓ Acute stress disorder
- ✓ Posttraumatic stress disorder (PTSD)
- ✓ Depression
- ✓ Alcohol and substance abuse disorders
- ✓ Anxiety disorders
- ✓ Somatoform and psychophysiological disorders
- ✓ Antisocial behavior
- ✓ Adjustment disorder
- ✓ Change of personality.

The individual's personality, pre-war lifestyle and experiences, as well as value and belief system all influence the outcome of war on him or her. For example, Nad et al. [8] investigated the relationships between spiritual well-being, intrinsic religiosity and suicidal behavior in war veterans with chronic posttraumatic stress disorder. The veterans in their study were of predominantly Catholic religious orientation. The authors have found lower levels of spiritual and existential well being in war veterans, compared to healthy controls, whereas the levels of religious well-being and intrinsic religiosity did not differ between the groups. *Veterans` suicidality inversily correlated with spiritual well-being, with the association being stronger for the dimension of existential well-being, rather than religious well-being.* According to their results, experiencing low existential well-being may imply an increased risk of suicidality. As some religious activities appear to be more frequent among war veterans than other population groups, this may reflect the veterans` increased help-seeking behavior due to existential distress.

Overall, war stresses are of physiological, cognitive, emotional and social nature. Defenses against breakdown in war times are *skill in combat, confidence in leadership, effectiveness of weapons, and the narcissistic idea of invulnerability* [9]. In therapy, the central concept is defensive inhibition.

Olkon [10] emphasizes, that essential mental factors, conductive to mental stability of a soldier, are neither acquired in the milieu nor greatly modified by training and culture. Whereas in everyday life, an individual may get along with the so-called 'faulty mental equipment', in time of severe crisis, such as that of an army life with its inflexible discipline

and hazards of war combat, it is not so. In the healthy and steadfast mental equipment of the soldier, there lies the safety and security of the army, which, in the other direction, also influences the individual soldier's psychological state and well-being. This bilateral relation can be understood as a point of crucial importance in every attempt of explanation of the influence of war-related factors on the individual's psychology.

King et al. [11] examined the relationships between pre-trauma risk factors (e.g. family instability, childhood antisocial behavior), war zone stressors (e.g. combat, perceived threat), post-trauma resilience-recovery variables (e.g. hardiness, social support), and posttraumatic stress disorder (PTSD) symptom severity. For both genders, direct links to PTSD from pre-trauma, war-zone and post-trauma variable categories were found. War-zone stressors appeared preeminent for PTSD in men, whereas post-trauma resilience-recovery variables were more salient for women (King et al 1999). On the basis of their results, the authors have urged researchers, policy makers, and clinicians to take a broad view on trauma and its sequelae, especially regarding possible multiple exposures to trauma over time, and the depletion and availability of important resources.

2. FOR THE BENEFIT OF YOU, ME, US IN TIMES OF CRISIS

There is no greater need for pro-social behavior and voluntarism than during and after war time. A crisis time can substantially heighten the readiness of people to hold on to each other and stick together - for the benefit of each individual and the group as a whole. Some investigative data [12] is available, suggesting a relative uniformity of volunteer behavior under the stress of war, which could very likely result from a general people`s tendency to coordinate their behavior in a way, which would maximize their effectiveness and from the adherence to the collective goals of the larger society, which strengthens community solidarity during stressful situations.

As the need for a structured environment is one of the most basic motives of humans, engaging in voluntary work during war might provide an additional benefit for people, who are engaging in it, as they may regain the feeling of being in control for a certain degree, in an otherwise unpredictable, chaotic time. Therefore, the benefits of voluntarism for the ones, who are the target group of it, as well as for the ones, who are providing it, may be at their peak in times of crisis.

Based on two examples from the Philippines, a local government project called Unilateral Suspension of Military Operations, and the establishment of a Peace Zone by a community of intrastate war refugees, a variety of sociopsychological processes have been shown to be involved in citizen-based peacemaking [13], including the undergoing a history of political violence and a 'last straw' violent episode, as well as mobilizing social influence to stop the shooting. *Political context* and the *peacemakers' psychohistory* act as antecedents of peacemaking behavior [13].

Missile stress and help-seeking behavior have been identified as positively correlating with anxiety and helplessness [14]. People who engage in intensive help-seeking behavior show more pronounced negative effects of missile stress on improved self-competence.

Some hypotheses have been developed, regarding a decreased suicide rate in times of war, based on the assumption, that war represents a specific framework in which the

possibility of expressing aggression in a socially desirable way dramatically increases [15], thereby reducing the amount of self-destructive behavior. However, Biro et al. [15] who investigated suicide and homicide rates in the former Yugoslav republics prior to and during civil war (1989 - 1994), have found a significant increase until 1993 in the rates of suicide as well as homicide. Afterwards, the high rates leveled off. They have explained these trends as possibly being influenced by the dramatic fall in the standard of living, which occurred at that time. As we know, poverty and non-advantageous socioeconomic conditions represent one of the crucial suicide risk factors, and they certainly go hand in hand with any war-time.

Sexual practices and sexual abstinence among soldiers and military staff have been a pretty popular subject of study in the last decades, although little research has focused on the question, which specific forms of sexual activity are actually practiced the most during war. Hart [16] had investigated this aspect of sexual behavior in war environment and found out, that the most frequently practiced sexual behaviors are masturbation, intercourse, and fellatio, while cunnilingus, anal intercourse, and homosexual behaviors were the least practiced. The author's findings demonstrated that environmental stress and relative peer acceptance may have a marked effect on sexual behavior, and the sexual output of every individual appears to be markedly influenced by his sociological background.

3. WHEN WAR AND CHILDHOOD OVERLAP

The psychological toll of war can be particularly high for the youngest members of our societies, who are often the most vulnerable targets. Childrens' coping with the war experience and their subsequent psychological adjustment is undoubtedly an important topic of professional discussion. Factors, such as *whether or not the child has been displaced from home, the child's age, gender, socioeconomic status, and country of residence* [17], may influence these processes. One of the major obstacles in exploring the psychological consequences of war, are the considerable methodological problems and limitations. Sequelae may include normal responses, such as heightened anxiety, and pathological responses, such as post-traumatic stress disorder and an increased incidence of antisocial and aggressive behavior [17]. Despite this high psychological cost for some, however, it is worth noting, that the majority of children, exposed to war and armed conflict, fortunately continue to cope and adapt successfully.`

As far as the potential long-term effects of exposure to war on children`s aggressive and prosocial behavior are concerned, Kerestes [18] has scientifically confirmed, that the exposure to stressful war events could very likely lead to negative long-term effects on these two behavioral dimensions in both genders. Generally, positive parenting was not able to protect children from negative effects observed in the scientific study on the topic, especially with regard to aggression. Children, who underwent the experience of war, represent an independent and specific target group when it comes to psychological post-war interventions, and these interventions might turn their socially based behavior patterns into the right direction again, after this behavior has been negatively affected by war-related factors. **Age** seems to be an important factor in determining the negative effects of war on children's behavior, whereas gender is not of special importance [19].

In a similar study, conducted by Flores [20], it was shown that *direct war exposure of children is associated with significantly higher incidences of war related events, disruption of schooling, and disruption of families,* than indirect exposure to war. The former is also closely linked to *higher incidences of PTSD, behavior problems and problems with psychosocial competence.* Children, whose friends had been wounded or killed in the war, and those who experienced parental separation due to the war, were at risk for PTSD, whereas those, who had friends wounded or killed in the war, and attended a lower grade in school, were at risk for behavior problems. *School attendance* represented an important determinant of higher levels of psychosocial competence, whereas higher frequencies of danger of personal injury or death, and lower levels of parental education were related to lower levels of competence [20].

The exposure of children to savage expressions of hate against the enemy at home might very well have a permanent antisocial effect [21]. The danger that children are brutalized during and after war seems to be especially high. Efforts to divert the destructive energies, that might arise as the consequence of adverse events, such as war, into constructive community effort, might therefore be very welcome and even inevitably necessary.

Macksoud et al. [22] investigated the number and types of traumas experienced by children between 10 and 16 years of age, who were exposed to war, and the relation of these experiences to their psychosocial development. They found, that *the number of war traumas is positively related to PTSD symptoms.* Children who were exposed to multiple war traumas, were bereaved, became victims of or witnessed violent acts, and/or were exposed to shelling or combat, exhibited PTSD symptoms. Children, who were separated from parents, reported depressive symptoms, while those who experienced bereavement and were not displaced, reported planning behavior. Prosocial behavior was shown by those who were separated from parents and who witnessed violent acts, possibly mirroring enhanced empathy through the own personal distressing experience.

The phenomenon of transmission of traumatic experiences from one generation to the next, is not to be underestimated, either [23]. When it comes to the psychotherapeutic treatment of childhood witnesses of war, *desensitization*, which was derived from behavior therapy, may be one of the more efficient techniques. Only in the case of too young or withdrawn children, it might not be the most suitable form of treatment [23]. Play-based psychotherapy might be a better option in those cases.

4. THE WAR IS OVER. NOW WHAT?

With a bit of word-play, we could say, that ‘the war is nowhere over, as soon as the war is over.’ The effects of armed combat are long-lasting and deep-rooted. If the war has been severe and damaging enough, it will substantially influence a sequelae of generations, which will come after the one, which had actually undergone war. Society as a whole may therefore be severely affected for a prolonged time in all public spheres, among others health, production and the economy sector.`

Successful reintegration of war veterans into civilized society has been an enduring nations` concern throughout the human history. Fontana and Rosenheck [24] developed and evaluated an etiological model of postwar antisocial behavior on the basis of two initial

models, which specified causal paths among five sets of variables, ordered according to their historical occurence:

i. Premilitary risk factors
ii. Military traumas and disciplinary actions
iii. The homecoming reception
iv. Postmilitary PTSD and substance abuse
v. Postmilitary antisocial behavior.

They refined and cross-validated the initial models, whereby PTSD and substance abuse were omitted in one, and included in the other. Comparison of the two models suggested, that [24] *pre-military experiences and behavior exert the largest effects on post-military antisocial behavior,* and that *PTSD plays a necessary mediation role for the effects of war-zone traumatic exposure on post-military antisocial behavior.* After all that has been said about the detrimental effects of PTSD, from the standpoint of an individual, as well as a broader social circle, it becomes clear, that the proper assessment of this disorder should and must become one of the public health priorities - in post-war times, even more so.

Furthermore, the post-war effects may influence us for a prolonged time way more profoundly than we might be aware of, as was shown, for example, by Shimp et al. [25] who had investigated *regional animosity,* a construct which represents the individuals' preference for their own (ingroup) geographic region and incorporates elements of animosity toward people from an outgroup region. The theoretical rationale for the existence of regional animosity and its role in affecting the consumers' evaluative judgments and price sensitivity, is given by the interrelated theories of social identity, stereotype activation, and consumer animosity. The authors demonstrated that among respondents, a strong preference exists for products and services that originate in their home region [25], and that the level of regional animosity correlates with the extent to which consumers choose products and services from their own region and the degree to which they are willing to pay medium prices to obtain these items. It might very well be possible, that this and similar effects arise as previous-war-related consequences in many areas of everyday life, which, to date, have not been entirely uncovered by investigative work.

When it comes to psychotherapeutic support for patients treated for war-related psychological traumas, it is necessary to consider the peace of the post-war era as an extension of the nightmare in which the victims are faced with severe emotional consequences of the war, the need for reparation of the lost, the sense of guilt, together with the cruel reality of economic sanctions, unemployment, shortage of medicaments, food and energy [26]. The combination of psychotherapy, whether in the case of supportive therapy, networking, individual and group cognitive behavior therapy, or systemic family therapy, and pharmacological therapy (anxiolitics and antidepressants) does not seem to produce any significant effects, unless the therapist is willing to be engaged in *exploring and resolving serious existential-economic problems,* which inpatients, suffering from war-related psychological traumas, typically have to face. Cognitive-behavioral and problem-solving-oriented psychotherapy approaches may therefore lead to most desirable results.

CONCLUSION

Human behavior during war is, in a large part, determined by social anxiety, which manifests itself in a variety of forms. Aggressive and help-seeking behavior are probably the most evident ones. Exposure to multiple traumas makes the negative effects on individuals' psychology even more prominent. Some positive effects, such as greater readiness and motivation to engage in volunteer work, however, might arise as a welcome consequence of a war-related crisis, and they need to be encouraged the right way, in order to maximize the benefits, which they are able to bring. In order to minimize the negative effects of war in all popualtion groups as efficiently as possible, the wider societal frame, in which the war occurs, needs to be considered. On the individual level, personality factors and previous life history need to be taken into account. Children deserve to be given special attention when determining psychological intervention strategies for the reduction of war-related distress and long-term psychological damage, deriving from it. Supportive approaches, e.g. psychotherapy, need to be real-life and concrete-problem-solving-oriented, if they are to provide real help for those, who need it most. We conclude our chapter with a quote by Edward Everett, who stated, that 'Education is a better safeguard of liberty than a standing army.' The authors of this book chapter agree wholeheartedly!

REFERENCES

[1] Vetter, Stefan. Understanding human behavior in times of war. *Military Medicine* 2007, 172 (12 Suppl): 7-10.

[2] Brown JF. The theory of the aggressive urges and war-time behavior. *Journal of Social Psychology* 1942, 15: 355 - 380.

[3] Rudmin FW. Cross-cultural correlates of war: Four studies. *Peace Psychology Review* 1995, 1 (2): 197-221.

[4] Burrow T. Neurosis and war: A problem in human behavior. *Journal of Psychology: Interdisciplinary and Applied* 1941, 12: 235-249.

[5] Allen BP. Frightening information and extraneous arousal: Changing cognitions and behavior regarding nuclear war. *Journal of Social Psychology* 1993, 133 (4): 459-467.

[6] Miksaj-Todorovic L, Singer M. *Differences in Behavior of Juvenile Delinquents Before and After the Homeland War.* Kriminologija & Socijalna Integracija 2004, 12(1): 27-32.ž

[7] Rundell JR, Ursano RJ. Psychiatric responses to war trauma. In R Ursano (Ed.), AE Norwood (Ed). *Emotional aftermath of the Persian Gulf War: Veterans, families, communities, and nations.* (pp. 43-81). Washington, DC, US: American Psychiatric Association 1996.

[8] Nad S, Marcinko D, Vuksan-Aeusa B, Jakovljevic M, Jokovljevic G. Spiritual well-being, intrinsic religiosity, and suicidal behavior in predominantly Catholic Croatian war veterans with chronic posttraumatic stress disorder: A case control study. *Journal of Nervous and Mental Disease* 2008, 196(1), 79-83.

[9] Stein M. Traumatic war neuroses: A survey of behavior disturbances under combat stress and their prophylaxis and treatment. *Neuropsychiatry* 1982, 2: 18-42.

[10] Olkon DM. Effect of war and army life contingencies on the behavior and breakdown of the inductee and soldier. *Diseases of the Nervous System* 1944, 5: 243-249.

[11] King DW, King LA, Foy DW, Keane TM, Fairbank JA. Posttraumatic stress disorder in a national sample of female and male Vietnam veterans: Risk factors, war-zone stressors, and resilience-recovery variables. *Journal of Abnormal Psychology* 1999, 108 (1): 164-170.

[12] Chen M, Shapira R, Regev H, Fresko B. Volunteering behavior and its correlates in adolescent males during the Yom Kippur War. *Series in Clinical & Community Psychology: Stress & Anxiety* 1982, 8: 317-320.

[13] Montiel CJ. Citizen-based peacemaking in a protracted war: Two Philippine cases. Peace and Conflict: *Journal of Peace Psychology* 1997, 3 (2): 115-134.

[14] Shirom A, Shperling Z. Missile stress, help-seeking behavior, and psychological reaction to the Gulf war. *Journal of Applied Social Psychology* 1996, 26 (7): 563-576.

[15] Biro M, Selakovic-Bursic S. Suicide, aggression and war. *Archives of Suicide Research* 1996, 2 (1): 75-79.

[16] Hart G. Sexual behavior in a war environment. *Journal of Sex Research* 1975, 11 (3): 218-226.

[17] Muldoon O, Cairns E. Children, young people, and war: Learning to cope. *Learning to cope: Developing as a person in complex societies*; pp. 322 - 337, xii, 360 pp. New York, NY, US: Oxford University Press 1999.

[18] Kerestes G. Children's aggressive and prosocial behavior in relation to war exposure: Testing the role of perceived parenting and child's gender. *International Journal of Behavioral Development* 2006, 30(3): 227-239.

[19] Rahav G, Ronen T. Children's perceptions of their behavior problems during the Gulf War. Anxiety, Stress & Coping: *An International Journal* 1994, 7(3): 241-252.

[20] Flores JE. Psychological effects of the civil war on children from rural communities of El Salvador. (posttraumatic stress disorder, anxiety, depression, behavior problems, psychosocial competence, war. *Dissertation Abstracts International: Section B: The Sciences and Engineering* 1999, 60(6-B), pp. 2983.

[21] Coghill HDeJ. *The effect of war on the behavior of children*. Virginia Medical Monthly 1942, 62: 429-436.

[22] Macksoud MS, Aber JL. The war experiences and psychosocial development of children in Lebanon. *Child Development* 1996, 67 (1): 70-88.

[23] de Levita D. Treatment of war-traumatized children in the former Yugoslavia. *Zeitschrift fuer Psychoanalytische Theorie und Praxis* 1996, 11 (2): 183-199.

[24] Fontana A, Rosenheck R. The Role of War-Zone Trauma and PTSD in the Etiology of Antisocial Behavior. *Journal of Nervous and Mental Disease* 2005, 193(3): 203-209.

[25] Shimp TA, Dunn TH, Klein JG. Remnants of the U.S. Civil War and modern consumer behavior. *Psychology and Marketing* 2004, 21 (2): 75-91.

[26] Pejovic M, Jovanovic A, Djurdjic S. Psychotherapy experience with patients treated for war psychotraumas. *Psychiatriki* 1997; 8 (2): 136-141.`

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 3

WAR, MASSIVE SOCIAL CHANGE AND SUICIDE

Said Shahtahmasebi*

The Good Life Research Centre Trust, Rangiora, North Canterbury, New Zealand

ABSTRACT

War, for whatever reason, can only mean massive social change. The human casualties of war due to these changes are not restricted to the soldiers who fight the war but the civilians on or near whose soil the war is conducted. The literature appears to associate a war-effect with suicide in various ways e.g. lowered suicide rate during a war but increased suicide using firearms by civilians, increased suicide in the army. However, most western researchers have concentrated on the returning soldiers from Vietnam, the Gulf, Afghanistan or Iraq. The literature suggests that the trauma of war for the soldiers (observing 'buddies' being gunned down/blown up and the trauma associated with modern warfare) is the cause of personality changes/depression and therefore the cause of suicide. By the same token, on the one hand not all returnees from active duty commit suicide and on the other such a trauma induced change due to war will also be prevalent in the civilian population; those, whose loved ones have been blown apart in front of them. In the context of suicide and war there are two main issues to consider. The first is understanding suicide, and the second is the provision of a health care service. Social and economic and environmental changes due to a *decision to go to war* will clearly cause changes at an individual level. As suggested elsewhere, it would be far too simplistic to associate the cause of change with the act of suicide. That is, out of those who are exposed to change, a small proportion will complete suicide, despite receiving medical help. In this chapter, it is argued that in spite of the large body of literature we are no further forward in understanding suicide. Furthermore, since macro-level changes are purely due to governments' actions it is their responsibility to protect their populations from suicide. But since we have little idea of the dynamics of suicide this responsibility must be focused towards improving the *quality of life* of those affected by war. It is unreasonable for the Army to promise more of the same suicide prevention programmes time and again given the year on year increase in the suicide rate. Furthermore, it is not sufficient to rely on the over stretched and ill-equipped health services to mop up the aftermath of massive social change due to a policy change or failed policies. Polices that

* Dr. Shahtahmasebi can be contacted at radisolevoo@gmail.com

are designed to affect social, political, economic or other changes must have public protection strategies built-in as standard, backed up with a unified database.

INTRODUCTION

There are two main questions to address when investigating suicide: why? And can suicide be prevented or 'treated'? The first question is very difficult to answer without a contribution from the suicide case(s). Even if it was possible for the subject to elaborate, this may only reflect the mental and emotional state of mind at one point in time. The rationale for a decision may well be biased towards certain life events when retold at a subsequent point in time. To address the second question a good understanding of the first question is absolutely necessary. In the absence of an insight into suicide, models of suicide prevention are heavily biased towards the hypothesized diagnosis or cause. For example, medical models strongly favour causes such as mental illness and in particular depression for which prescription drugs are readily available whilst social models stress a macro- and micro- level change such as the national economic downturn or personal bereavements, divorce or financial hardship.

The problems associated with obtaining insight into why some people commit suicide has led to confusion and contradiction in the literature thus misinforming the process of policy development. For example, in suicide research, Beautrais (1-3) claims that depression and mental illness are the cause of suicide, Khan et al (4) claim that antidepressants do not reduce suicide and may increase the risk of suicide while Hall et al (5) claim that antidepressants reduce suicide rates. A critical assessment may reveal that these studies have failed to address the methodological issues related to design, data collection and analysis, thus resulting in misleading conclusions. Beautrais's psychological autopsy approach(3) is fundamentally flawed for several reasons. First, this approach allows a high level of bias through an assessment of the cases by friends and relatives (given that the public mindset is inclined to a causal relationship of depression/mental illness and suicide, particularly after the event). Second, it fails to account for bias in data (the confounding and compounding of random effects such as error-in-variables with the structural error). Unfortunately, the Canterbury Suicide Project(3) has been a source of information both for the New Zealand Government policy making which includes funding of research in suicide and suicide prevention and which is reflected in the suicide prevention strategy (6). It is not surprising to note a confused approach to public health policies on suicide with a heavy emphasis on a psychiatric service approach to suicide prevention. By the same token the Associate Minister has been very careful to list in the suicide prevention strategy every possible life event and behaviour such as bereavement, alcohol and drug abuse, divorce, educational and financial failures, unemployment, unstable childhood, trauma, as causes of suicide. Would it make any difference to any suicide prevention strategy if war is added to this list?

RATIONALE AND METHODOLOGY

Much has been written about suicide. There is a huge amount of literature on the topic. For example, a search of PubMed using the term 'suicide' for English only publications yielded 47,342 hits, 61,713 hits in ISI Web of Knowledge (Social Science Citation Index),

whilst a similar search in Google and Google Scholar produced 73,200,000 and 1,150,000 hits respectively. It is interesting that given both war and suicide have been a feature of human history a similar search using 'war suicide' yielded 344; 309; 410; 23,400000 and 148,000 hits in PschInfo, PubMed, ISI Web of Knowledge, Google and Google Scholar respectively. The first few pages of the results from Google reveal a fairly large number of alarming articles and reports about the increasing rate of suicide in the US Army. In particular, the focus of attention is suicide rates as a result of the recent wars in Iraq, Afghanistan and the Gulf war.

As mentioned above, there is contradiction in the literature. However, whether there is consensus in the literature about our *understanding* of suicide or not, suicide rates appear to have a dynamic property – when there is a drop in the suicide rate, the authorities and practitioners claim the success as the result of their policies and when the rates show an upward trend the explanation often is that suicide is a complex issue which depends on many social, economic and personal variables and requires further research (7). The questions that should be asked much more frequently are:

- How good a fit is our model?
- How well do we understand suicide?
- Does our model reflect understanding of suicide?
- Do we need more than one model to describe suicide?
- Do we need more than one model of suicide prevention/intervention?

Both the media and the literature are dominated by reports of suicide in the US Army mainly by the returnees. There are also references in the literature to suicide in the military due to war in other parts of the world. The immediately obvious difference between American wars and others with the exception of the British Falkland war is the US Army has been engaged in battle a long way away from home. It is also striking that immediately observable are the suicide rates for the US Army than any other army. And so far it is the US Army reports and the media reporting that provide suicide statistics for the Army. The media also report on promises of more action to prevent suicide by the authorities with the release of each report.

This chapter is not intended to be a review of media reports or the literature on suicide in the US military. To address some of the questions posed above it seems reasonable, however, to explore the Army reports released recently and reported in the media together with the reported suicide statistics. Such exploratory work is useful and provides an idea of how suicide, its prevention and suicide rate is perceived by the authorities concerned but it will inevitably raise a number of questions in the context of what the general concept/understanding of suicide is by society. Raising relevant questions is a good thing and is an integral part of a critical approach.

A reflective observational (as opposed to survey design) approach was adopted for the following reason. Mindful of the issues mentioned in the introduction and discussed further in (7-11)e.g. dynamics of human behaviour including the feedback effect, the interest in this chapter is to explore what kind of materials are readily available. An initial inspection of the Google search results suggested that there were many official statements indicating the suicide rate in the US Army, and the type of actions to address it and any changes in the

suicide rate and/or changes in the approach to suicide prevention (e.g. changes in suicide trends and changes in prevention/support services). Such an approach may lead to a discussion of the central issue in any research concerned with human behaviour. That is, how the Army and/or the civilian authorities including researchers and practitioners take note of temporal dependencies for the development of interventional/preventional strategic policies.

The availability of the annual reporting of suicide trends in the US Army by the media provided the context in which to develop this chapter. Civilian suicide due to war did not appear to be as big a feature as in the military within the war and suicide literature. However, there is evidence in the literature that the suicide rate remains dynamic e.g. during a war whilst the overall suicide rate may fall youth suicide and in particular the use of firearms may increase, see (12-14). In particular, civilian suicide as a result of the effects of a war may take a much longer period of time to manifest which may be explained by theories such as cumulative and cognitive dissonance.

WAR AND SUICIDE

In recent literature war and suicide appear synonymous with suicide in the military in particular returnee soldiers from active duty(15). There are references to civilian casualties mainly through the deliberate targeting of civilian populations, unexploded mines, cross-fire, suicide bombing, and so on (e.g. see (16-18)). However, war is a major life changing decision at all levels of society and will have health consequences at an individual level (e.g. see (19)). This effect may well have varied since 1942 with the changes in warfare technology, social, attitudes and perceptions(18). It is therefore likely that society, in relation to health outcomes, may be slow to react to the effects of war and these effects manifest themselves as post-traumatic stress disorder (PTSD) which over time may become chronic PTSD or complex grief (e.g. see (13, 20, 21)). There are also references in the literature to violent death (in particular of youths) and the use of firearms in suicide during war (e.g. see (12-14)). On the other hand such concepts as PTSD are the products of a western ontology and value system - they may not fit with the population in the rest of the world (22). During and in the aftermath of a war the immediate and visible consequence is death. However, death by suicide in the military has concerned the authorities. In the West, the US Army has reported a year upon year increase in the rate of suicide since 2003. By January 2009 the suicide rate in the Army had exceeded the national average – the question that arises is whether the model of treating suicide for PTSD fits this population?

A decision to take military action and go to war is a socio-political one. The government at the time has to persuade the public that war serves the country better and is in its best interest. Regardless of the process of making a decision for military action, any war means a massive social change both for the public and those who fight the war. At macro-level, the political decisions that will affect social, economy and health policies which in turn will influence policies and practices at regional and community level. At individual level, quality of life, lifestyles and standard of living will be affected thus leading to emotional stress, trauma and poor mental health. On the whole both the society and individuals will be exposed to the evils of war directly or indirectly e.g. through combat, through loss of a loved one or via the media.

The literature on suicide is huge and as mentioned above, a restricted search of Google and Google Scholar using 'war suicide' was carried out. A quick review of the first few articles which are based on (US) Army reports reveals that once more actions to reduce the suicide rate have been taken or promised yet the suicide rate continues to rise. For example, a 2003 report [http://usmilitary.about.com/cs/terrorism/a/arsuicide.htm] suggested a suicide rate of 17.3 per 100,000 in the soldiers deployed to Kuwait and Iraq. The report further stated that the overall suicide rate for the Army was 12.8 per 100,000 for the same period. Furthermore it appeared that officials console themselves that the suicide rate, although high, it is lower than the national average of 21.4 per 100,000 for males in the same age group (20-34).

Of particular interest is the statement on preventional/interventional action that needs to be taken to reduce suicide rates. The report suggested that recommendations some of which had already been put into place included beefing up the Army's suicide prevention programme and making behavioural health care more accessible to soldiers in combat and other high stress environments.

Without making any assumptions about the Army's suicide prevention programme and regardless of whether it followed a medical model or not it is of particular interest to view another article from the Google results. This next report is dated May 2008 and is more alarming than the previous report. The report [http://www.voanews.com/english/2008-05-29-voa64.cfm] confirms that the rate of suicide of soldiers on active duty was 19 per 100,000 soldiers. The rate was just under 10 per 100,000 in 2002, before the Iraq invasion, and has been rising steadily, except for one year, ever since. The rates for the last two years are the highest since record keeping began in 1980.

Interestingly, in the 2008 report, the Army claims that the suicide rate of 19 per 100,000 soldiers is still lower than the rate for people of a similar age and education level in the rest of American society. The Army qualifies its statement with the assertion that the rate is too high because the Army should be able to provide mental health care and other support to its troops.

Therefore the question is one of whether the Army has not been able to provide mental health and other support to its troops, or, the model of care provision (suicide prevention programme) has been operating in the opposite direction.

Thus, Army officials appear to refocus the causes of suicide:-

> Officials say personal issues such as relationship problems, trouble at work and legal or financial difficulty are among the main causes of suicide in the military, just like among the civilian population.
>
> The Army says it is working hard to improve access to mental health care among the troops, to reduce the stigma often attached to seeking counseling, and to train soldiers to recognize signs of stress in themselves and their comrades. But senior officers also acknowledge there is much more work to be done to help soldiers deal with personal problems compounded by the stress of combat.

Here the Army introduces additional parameters from the civilian population. However, as discussed previously (7-11) civilian population suffers from exactly the same flaws in development of suicide prevention strategies/programmes.

At this point it is sufficient to quote one more report from the Google search results [http://www.cnn.com/2008/HEALTH/09/09/army.suicides/index.html] which appear to

suggest that the Army suicide rate in 2008 may pass the national suicide rate of 19.5 per 100,000 soldiers. Once more the report suggests that:-

> Officials attribute rise to increased pace of operations, number of deployments. Mental health experts recommend increased screening for pre-existing conditions.

Which is confirmed by another report further down the list of results from the Google search [http://www.voanews.com/english/2009-01-30-voa59.cfm]. In this report the same rhetoric may be observed:

> "Why do the numbers keep going up? We cannot tell you. But we can tell you that across the Army, we're committed to doing everything we can to address the problem," promised Secretary of the Army Pete Geren.

The above dynamic is not limited to the US Army. It can be noted that other armies who engaged in war in particular, away from the boundaries of their own country have suggested an increase in suicide activities among its returnees e.g. the British and the Falklands war [http://news.bbc.co.uk/1/hi/uk/1758301.stm] or generally in the army e.g. [http://www.cdi.org/russia/johnson/7257-3.cfm;http://engforum.pravda.ru/showthread.php?t= 216948].

However, it must be remembered that soldiers are people too, but unlike the general public they receive intensive physical and mental training that is supposed to prepare them for combat: it is their sworn duty to defend their country's sovereignty, borders and its civilians. The macro-level decision to go to war in a foreign land raises a number of research questions such as what are the micro-level implications for individuals of fighting in a war that they cannot claim ownership? What are the possible interactions between an individual's beliefs, army training and exposure to combat? What are the feedback effects of a personal philosophy, war and witnessing civilian death in particular by the invading army on a future perspective on life? And so on and so forth.

Naturally the main focus of the literature under the main theme of 'war and suicide' has been mainly at an individual level i.e. those who are directly involved with the military, namely the soldiers. Soldiers have families and families form communities. Thus, a question that arises is what about the soldiers' families? What are the effects of a second-hand trauma? During a war, parents and families of soldiers are exposed to a *trauma* of a different kind: having to wait for news from the front, receiving bad news, or having to deal with their sons/daughter's suicide during or after their return. Does war affect civilians in the same way?

As discussed in the introduction, the literature on suicide in the general population does not provide an insight into why some people commit suicide. However, for a proportion of the suicide cases, a macro-level change such as a change in a government's social, economy and health policies, war and, economic recession may lead to micro-level change thus influencing some individuals to choose death over life. There is no doubt that war will leave psychological scars at a social and individual level for years to come. It is plausible that this chronic change affects the quality of life of individuals through changes in their emotional, mental and physical health.

Unfortunately the suicide literature on this aspect of the war is lacking. Perhaps as mentioned above the effect of war on the suicide rate of the civilian population may not

manifest for some time, therefore in the short term what effect is observed, such as the use of firearms in suicide (12), may be dependent on the nature and duration of the war e.g. Lester reports that suicide was lower during the wars than peace time in France (23). The long-term effect of war on suicide may then be confounded/compounded with a feedback effect through changes in behaviour leading to other life changing events such as unemployment and divorce which the general suicide literature appears to suggest as causes of suicide (6, 24).

However, temporal dependencies will lead to different outcomes in individuals with similar characteristics i.e. some may commit suicide whilst others may not. There may, for example, be inertial tendencies with individuals slow to react to changes in circumstances, perhaps as a result of exposure, changing social expectations and shifting social norms. Another example is the notion of 'cumulative inertia' in which the tendency to move in the next time period from the current state to another decreases with the length of duration in the current state (25, 26). Factors underlying dependence include increasing social, economic and community ties with duration in a social state. The theory of cognitive dissonance is another example. Under this theory individuals align their attitude to their current social state, upgrading the satisfaction with both positive and negative attributes of their current state and down grading those of possible alternatives. Thus, cross-sectionally, measures such as stress, trauma and self-esteem will appear as important parameters for developing a social/health policy.

TREATMENT OF SUICIDE

In economic terms most governments claim to have in place a ‘safety net’ policy in the form of housing benefits and social security to protect society against poverty. Yet, there is an absence of such a philosophy for suicide prevention when macro-level changes due to a government’s own decisions e.g. in housing, economy and finance, health and social policies, conflict and war, lead to micro-level changes. Whilst governments talk about an urgent need to reduce suicide rates, often action is coordinated through mental health services urging individuals to seek help. Frequently for those who seek help, suicide attempts and suicidal behaviour is treated for mental illness and depression. In dedicating their book to a Viet Nam veteran, Sonnenberg and colleagues (27) presented his life event history to highlight the plight of war veterans lost to suicide due to post war and post-traumatic stress. In this dedication, in my view there are two important and interesting points to consider. Firstly, Sonnenberg and colleagues detail the exposure of the case to the evils of war and the witnessing of death and destruction in particular those of his comrades. The implication is that these events during active duty led to the case’s suicide. Secondly, they state that although the case agreed to receive help and despite having quality psychiatric treatment the case committed suicide: in total over the period 1972-76 the case had been seen by 15 different psychiatrists, social workers and psychologists. It may be argued that mental health service practice has advanced considerably since the 1970s, however, the question is have these advancements led to commensurate reductions in suicide?

Consider the first point: suicide during war time follows a similar pattern to suicide behaviour in other settings. In a sample of the population, of individuals with similar characteristics and exposure to life changing events a small proportion may commit suicide whilst others may not. By the same token, most of the army on active duty will have been

exposed to death and destruction yet not all develop suicidal behaviour nor commit suicide. Furthermore, not all the suicide cases in the military had been or had returned from active duty, a substantial proportion of the suicide cases had never been on duty. This is analogous to the perceived depression-suicide link: in the population only a small proportion of the suicide cases have had contact with the mental health or psychiatric services and out of those only a small proportion may have been diagnosed with depression (8, 9).

Conversely, out of those potential suicide cases who have sought help or have received interventional services a proportion may commit suicide while receiving care. Suicide in a secure mental health unit setting has been of concern. In the early 90s the British Government (28) introduced a set of national targets for the population which included a percentage reduction in suicide within the psychiatric units. Regardless of whether the target reduction was achieved or not we know that some individuals still completed suicide whilst in care and some almost immediately after discharge and some within six months (8). This situation is not too dissimilar to the Viet Nam veteran case in Sonnenberg's book.

The interesting point of the Viet Nam veteran's case was that not only did Sonnenberg not report suicidal behaviour or attempts by the case's survivors due to exposure to the trauma of witnessing a loved one's deteriorating quality of life and finally death, but also the case's wife's effort led to the recognition of post-traumatic stress as the lead cause of the case's suicide and were awarded damages.

It is not sufficient to expect that general practitioners (GPs) and antidepressants to be the first line of defence against suicide. However, it is not very difficult for central governments to develop a policy of coordinated multiagency action e.g. see (29, 30).

A point that arises time and again is whether suicide is being treated as depression because there are prescription drugs for depression but not for suicide. In the recent report mentioned earlier [http://www.voanews.com/english/2009-01-30-voa59.cfm] the US Army promised to do what it can to address the problem. Furthermore, the following was reported in the same article:-

> Colonel Elspeth Ritchie, a psychiatrist in the Army Surgeon General's office, said while the army is hiring and training more medical workers, more involvement is needed.

An interesting point of concern is the mentioning of 'hiring' and 'training' by the psychiatrist. Given the background of suicide in the Army the answer to the question 'training for what?' may become clearer in previous statements. In a report in 2008 http://www.voanews.com/english/2008-05-29-voa64.cfm it was suggested that the main cause of suicide was related to the individuals' circumstances:

> Officials say personal issues such as relationship problems, trouble at work and legal or financial difficulty are among the main causes of suicide in the military, just like among the civilian population

But in the same report in 2008 the same Army Official Colonel Elspeth Ritchie suggests:

> That the stress of the wars in Iraq and Afghanistan is also part of the reason for the rising suicide rate in the Army.

It is apparent that the emphasis is on a medical model. Training more staff to deliver more of the same within the same suicide prevention strategy must be critically evaluated. As discussed elsewhere (31) because of the dynamic nature of human behaviour when holistically viewed, education and training, researchers, practitioners and decision makers are part of the suicide problem rather than the solution. The suicide rate has a cyclic trend and it will not be society nor the Army officials who will claim a victory against suicide when the current cycle ends.

By the same token when holistically viewed other models of help may be more easily visualised than a simplistic view of suicide as a mental health issue. There are models of treating suicide which mainly rely on the willingness of the case to come forward and agree to treatment. For example, in a series of papers Ventegodt and colleagues (30, 32-36) argue for a holistic approach to the treatment of mental disorder issues including suicide and quality of life. The authors further report the treatment of a 22 year old patient presenting a long history of childhood sexual abuse, incest and rape (30). In this case the authors adopted their "holistic" approach to developing treatments and applied it to this case. After 100 hours of intensive therapy the case, through this holistic approach was supported and taught to confront her life issues, understand them and deal with them in such a way to help her make an informed and "free" choice about "life" or "death", as opposed to a "command" choice based on drug therapy. The authors, quite rightly argue against the current medical model of treating suicide; the use of medication and drugs may only treat the symptoms and the real issues that the patient should be made aware of and given the skills to deal with are masked. In the case reported by Sonnenberg and colleagues(27), after the event of suicide, letters that the case had written to his wife whilst on duty about the harsh realities of war had potentially revealed some clues about his state of mind. In particular, although the case had expressed his feelings on paper he 'needed' to talk about what he had witnessed at the time. Yet, after writing the letter he never talked about it after his return. A case who sought and agreed to help never received it. It seems that regardless of how good the psychiatric services were that the case received, this was good enough to postpone the final event during which time the quality of life of the case had deteriorated. Clearly, this is not the only case and there are many similar cases that potentially would fit well into the model of Anna's treatment.

Another model for suicide prevention is one that engages the community at grassroots. For example, Omar (29) suggests a holistic suicide prevention approach at grassroots. Whilst Ventegodt & Merrick's holistic approach (30) was mainly treatment i.e. intervention, Omar's approach is more preventional. Although, still in its eighth year initial results suggest positive outcomes:-

> Youth suicide in the area covered by the programme has been stable or declining since the project started. That is holding up 7 years in a row.
>
> Hospitalizations for suicide attempts in the area have dropped by 30%.
>
> The rest of the state: completed suicide and suicide attempts have increased by 20% for the same period.

This approach, too, is subject to influence from other social processes such as central and local government policies, the media and entertainment industry e.g. see (7). However, a

collective effort by all the stakeholders involved will increase the likelihood of a sustainable success. Thus, providing some evidence for the need for higher social involvement in developing heath promotion policies (10).

As mentioned earlier the increase in the suicide rate in the Army has been mainly attributed to PTSD. It has also been claimed that a suicide prevention strategy has been put in place to prepare the soldiers by recognising signs of PTSD and counselling services – furthermore, the officials appear to promise more action in the form of more access to mental health programmes. But, there is very little, or no talk of programmes to support and improve the quality of life of the returning veterans and their families. There is insufficient evidence to assume that a programme of suicide prevention to prepare soldiers against suicide will increase their protection against suicide in peace time or during a war.

DISCUSSION

It is apparent that suicide occurs anywhere and by anyone despite apparent safeguards to protect the public. Suicide occurs even in secure organisations such as prisons and psychiatric units, and in organisations where its members have been prepared for anything through training and discipline such as the army. In the words of the US Army officials [http://www.voanews.com/english/2008-05-29-voa64.cfm]:-

> Army officials say the military suicide rate is still lower than the rate for people of similar age and education level in the rest of American society. But they say it is too high because the Army should be able to provide mental health care and other support to its troops.

Regardless of the contradiction in the literature about the suicide prevention methods the literature provides evidence that suicide is not unique to a particular group within a population; whilst there is a current emphasis in the media on suicide by the soldiers on duty or returnees a similar or higher proportion of soldiers who have not been on duty also have committed suicide. Similarly, over and above depression and mental illness the literature suggest suicide in other groups such as the elderly (37-39), students (40, 41), patients with various diagnosis (42, 43), suicide during pregnancy (44), within patients with mental ill-health e.g. depression, polar disorder (45, 46), and son. Once again, statistically viewed, given the proportion of suicides in each category it is not possible to generalise suicide parameters from groups to the general population. For example, suicide in patients with depression forms a non-random sample of patients with a mental illness diagnosis which in turn is a non-random sample of all who suffer with depression in the population. Inference from this sample (suicides with depression) cannot be generalised to the general population and therefore does not amount to evidence of a causal relationship between a diagnosis (or an event) and suicide. Commonly depression has been blamed as the cause of suicide without sufficient evidence; around two-thirds of suicide cases do not appear to have a psychiatric record or to have come into contact with mental health services, and only a proportion of those who had a psychiatric record had depression either diagnosed or mentioned in their report (8, 9).

- Do we really understand suicide?
- Will a model of giving medical terms such as PTSD for a human reaction to life events explain suicide?
- As a result are we as a society providing the best protection and intervention against suicide?
- Or have we, as a society, through our uncritical acceptance of evidence become the problem?

Self-critical evaluation is an important and integral step in any research and most certainly should be an integral part of any policy. Without this step, the research evidence will be unreliable and thus policies' based on inconsistent evidence will be one of "hit and miss" at best. An important consequence will be on the feedback loop between training and practice, for example, in designing research studies medical students are still encouraged to think within the box and narrow down a health issue to a single hypothesis or a number of hypotheses where simple significance test may be applied (31).

We have very little or no insight into suicide and yet we continue to promote prevention strategies based on a medical model that takes away the process of decision making and replaces it with a mental illness for which drugs may be prescribed. If such a model has been successful then we should expect some indication of supportive evidence in the huge suicide literature, however, small the evidence. Instead, we may observe two phenomena: the first is that the suicide rate appears to have an upward trend, and the second is that suicide is rapidly becoming an option to a problem through the huge publicity (media reporting) of euthanasia supporters e.g. see (11).

Some commentators argue that macro-level social change has already been researched and there are social models of suicide prevention. What the suicide pattern in the Army suggests is that all the models on their own have not effected suicide at an individual level nor at the macro-level. Suicide rates have been dynamic in any group in the population. At the end of a cycle for a particular group, unwisely the authorities assume that the downturn has been due to the prevention programmes and turn their attention to the next group. The problem is that by the time the same prevention programmes are applied the first group may begin its new cycle. It is then that the authorities announce suicide is the result of many variables and it is no different in the Army:

> Personal issues such as relationship problems, trouble at work and legal or financial difficulty are among the main causes of suicide in the military, just like among the civilian population.

The commentators may be right that there are social models of suicide but like their counterparts in other disciplines they have failed to acknowledge the same issues of dynamics that also hinders the social models. For example, when suicide is viewed holistically, the education and training also becomes part of the problem for failing to visualise temporal dependencies in human behaviour. As such the upskilling of students and researchers to practice evidence-based decision making takes a narrow view of simplifying an issue into a hypothesis testing exercise. As mentioned before such a practice is of meagre value and is blind to the effects of macro- and micro- level health and social and economic changes.

Failing to visualise temporal dependencies that are inherent to human behaviour, in particular a feedback effect, the commentators seem to imply that there are models of suicide prevention and therefore there is no need for further research/discussion, and, secondly these models are successful in preventing suicide. Such comments are reflective of the general academia and decision makers' mindset: a persistence to maintain the status quo and prevent the inclusion of other dynamic issues such as quality of life. The arrogance of an uncritical use of evidence is a persistence that is based on the peak of the previous cycle. The problem is that the length of each cycle is relatively unpredictable and clearly depends on the macro- as well as micro-level social changes.

Quality of life is not fully explored in relation to suicide, in particular, in relation to the returnees and their families and, similarly, those civilians who are exposed to massive social and life change. The literature on studies of quality of life of returnee soldiers suggests significantly higher risk of impaired functioning and diminished quality of life than those soldiers not in active duty (47-50). Specific studies of female veterans also report very similar results (51). Additionally, Weeks and colleagues (52) report differentials in health outcomes between those veterans who live in rural settings compared with their counterparts in urban and suburban areas. Such studies also suggest that diminishing functioning and quality of life are affected even years after the war (e.g. see (49)). In the context of war, it is not surprising that like suicide most studies associate the lower quality of life and functioning to PTSD. Zatzick and colleagues (47) has called this group of veterans *difficult to treat* patients and suggest that the effects of PTSD may well be the core problem in this group. However, some studies (e.g. see (53)) suggest that these health effects may manifest themselves in both psychological and physical outcomes, and recommend that health care providers must be attentive to recognize and evaluate both of these dimensions.

In parts, it is plausible that *difficult to treat* may be referring to a set of non-responsive symptoms to treatment – like suicide. On the other hand the reason for a non-response may lie in the relationship between individuals and their perceived relationship with war, society, community and family. As mentioned above, in 1985 Sonnenberg and colleagues (27) described the diminishing quality of life and functioning of Viet Nam Veterans' after their return from active duty, and, its effects on the lives of their families. Interestingly, a book in 1996 (54) with contributors from the Army, Navy, the US Administration, practitioners and academics is one of a few that made a reference to soldiers, their family, community and the nation. In the first paragraph of the foreword it is claimed that the Gulf War affected the *entire* nation. But more importantly is the suggestion that the book provides a holistic focus for addressing the issues of war in the first place including the lessons learnt. The emphasis of the book is placed on the best medical and psychological care for the military members and their families being central to the mental health and effectiveness of fighting forces. It is rather ironic!

CONCLUSION

We may be unable to prevent those who have chosen death (whether war veterans or members of the public) and are determined to complete suicide. But it would be irresponsible to fail those who seek our help, be it direct or through suicide attempts and self-harm or other

risk taking behaviour, by adopting simple assumptions and prescription drug therapy. We will have more insight into why some people commit suicide *only* when we as researchers and decision makers accept that it would be acceptable to admit we do not understand suicide, take a step back and adopt a more holistic approach rather than lump the responsibility onto the lap of the medical establishment (7, 11, 31, 55).

Suicide appears to be persistent and affects every section of society: some more than others at various periods in time. This persistence appears to be matched by the authorities who, after decades of *unbalanced* and *uncritical* research believe that suicide can be remedied with the application of a medical model or a social model. As part of a holistic approach there must be a more balanced distribution of resources, information and knowledge perhaps through a unified database (10), innovative thinking and research funding.

Finally, the core business of the army is war. Any future studies of suicide must consider the differentials in suicide rates due to belonging to a professional army that promises a career structure or belonging to an alternative army where volunteers and conscripts form the front line. Furthermore, the effects on suicide rates (and generally mental ill health) from the different types of conflict e.g. being an invading force, defending force, or a peace keeping force may well be very different both on the civilians themselves and the army personnel. Moreover, within the health service sector there is a belief that some of the accident (e.g. road accidents) might be acts of suicide or suicide attempts. There are few records of survivors admitting driving into electricity pylons or trees one such case is briefly mentioned in ((7), p297). If this assumption holds for the army in particular during a conflict then the total suicide rate may well be underestimated. These issues will need to be investigated further.

REFERENCES

[1] Beautrais AL. *Serious suicide attempts in young people: a case control study* [PhD]. Christchurch: Dept. of Psycholigical Medicine, Christchurch School of Medicine; 1996.

[2] Beautrais AL. Suicides and serious suicide attempts: two populations or one? *psychological medicine.* 2001;31:837-45.

[3] Beautrais AL, Joyce PR, Mulder RT. The Canterbury suicide project: Aims, overview and progress. *Community Mental Health in New Zealand.* 1994;8(2):32-39.

[4] Khan A, Warner HA, Brown WA. Symptom Reduction and Suicide Risk in Patients Treated With Placebo in Antidepressant Clinical Trials: An Analysis of the Food and Drug Administration Database. *Arch Gen Psychiatry.* 2000;57:311-17.

[5] Hall WD, Mant A, Mitchell PB, Rendle VA, Hickie IB, McManus P. Association between antidepressant prescribing and suicide in Australia, 1991-2000: trend analysis. *BMJ.* 2003;326.

[6] Associate Minister of Health. The New Zealand Suicide Prevention Strategy 2006-2016 *Ministry of Health 2006. Wellington.* 2006*;http://www.moh.govt.nz/suicideprevention.*

[7] Shahtahmasebi S. Suicide Research and Adolescent Suicide Trends in New Zealand. *TheScientificWorldJOURNAL.* 2008;8:287-302.

[8] Shahtahmasebi S. Suicides by Mentally Ill People. *TheScientificWorldJOURNAL.* 2003;3:684-93.

[9] Shahtahmasebi S. Suicides in New Zealand. *TheScientificWorldJOURNAL.* 2005;5:527-34.
[10] Shahtahmasebi S. Researching health service information systems development. In: Dwivedi A, ed. *Handbook of Research on IT Management and Clinical Data Administration in Healthcare*. In press: IGI Publishing; 2008.
[11] Shahtahmasebi S. Can suicide be quantified and categorised? In: Sher L, ed. *Internet and Suicide.* Vol forthcoming. New York: Nova Science Publishers, Inc.; 2008.
[12] Louks JL, Otis GD, Smith JR, Hayne CH, Trent HE. Young male violent death trends in the general population during the Vietnam era. Paper presented at: *Annual Meeting of the American-Association-of-Suicidology;* Apr, 1996; St Louis, Missouri.
[13] Curran PS, Miller PW. Psychiatric implications of chronic civilian strife or war: Northern Ireland. *Advances in Psychiatric Treatment.* 2001;7(1):73-80.
[14] Henderson R, Stark C, Humphry R, Selvaraj S. Changes in Scottish suicide rates during the Second World War. *BMC Public Health.* 2006;6:167.
[15] Friedman MJ. Posttraumatic Stress Disorder Among Military Returnees From Afghanistan and Iraq. *American Journal of Psychiatry.* 2006;163(4):586.
[16] Downes AB. Desperate Times, Desperate Measures: The Causes of Civilian Victimization in War. *International Security.* 2006;30(4):152-95.
[17] Spiegel PB, Salama P. War and mortality in Kosovo, 1998–99: an epidemiological testimony. *The Lancet.* 2000;355(9222):2204-09.
[18] Summerfield D. The impact of war and atrocity on civilian populations. In: D. Black, M. Newman, J. Harris-Hendriks, eds. *Psychological Trauma: A Developmental Approach*. London: Gaskell; 1997:140-55.
[19] Glover E. Notes on the Psychological Effects of War Conditions on the Civilian Population. *International Journal of Psycho-Analysis.* 1942;23:17-37.
[20] Neria Y, Gross R, Litz B, et al. Prevalence and psychological correlates of complicated grief among bereaved adults 2.5-3.5 years after September 11th attacks. *J. Trauma Stress.* Jun 2007;20(3):251-62.
[21] Tarrier N, Gregg L. Suicide risk in civilian PTSD patients. *Social Psychiatry and Psychiatric Epidemiology.* 2004;39(8):655-61.
[22] Bracken PJ, Giller JE, Summerfield D. Psychological responses to war and atrocity: The limitations of current concepts. *Social Science & Medicine.* 1995;40(8):1073-82.
[23] Lester D. The effect of war on suicide rates: a study of France from 1826 to 1913. *European archives of psychiatry and clinical neuroscience.* 1993;242(4):248-49.
[24] Kposowa A. Unemployment and suicide: a cohort analysis of social factors predicting suicide in the US National Longitudinal Mortality Study. *Psychological Med.* 2001;31(01):127-38.
[25] Ginsberg RB. Semi-Markov Processes and Mobility. *Mathematical Sociology.* 1971;1:233-62.
[26] McGinnis R. A Stochastic model of social mobility. *American Sociological Review.* 1968;23:712-22.
[27] Sonnenberg SM, Blank AS. *The Trauma of War: Stress and Recovery in Viet Nam Veterans*: American Psychiatric Pub, Inc.; 1985.
[28] Secretary of State for Health. *The Health of the Nation*: HMSO. London;1992.
[29] Omar H. A model program for youth suicide prevention. *Int J Adolesc Med Health.* 2005;17(3):275-8.

[30] Ventegodt S, Clausen B, Merrick J. Clinical Holistic Medicine: The Case Story of Anna. III. Rehabilitation of Philosophy of Life During Holistic Existential Therapy for Childhood Sexual Abuse. *TheScientificWorldJOURNAL.* 2006;6:2080-91.

[31] Shahtahmasebi S, Shahtahmasebi R. Society, change and suicide. *TheScientificWorldJOURNAL.* 2009;submitted.

[32] Ventegodt S, Andersen N, Neikrug S, Kandel I, Merrick J. Clinical holistic medicine: holistc treatment of mental disorders. *TheScientificWorldJOURNAL.* 2005;5:427-45.

[33] Ventegodt S, Kandel I, Neikrug S, Merrick J. Clinical holistic medicine: the existential crisis- life crisis, stress, and burnout. *TheScientificWorldJOURNAL.* 2005;5:300-12.

[34] Ventegodt S, Merrick J. Philosophy of life and suicide: to be or not to be is still the question. In: J M, G Z, eds. *Suicidal behaviour in adolescence: an international perspective*. Tel Aviv: Freund Publishing House LTD; 2005:9-17.

[35] Ventegodt S, Merrick J. Suicide from a holistic point of view. *TheScientificWorldJOURNAL.* 2005;5:958-766.

[36] Ventegodt S, Merrick J, Andersen N. Quality of life as medicine: a pilot study of patients with chronic illness and pain. *ScientificWorldJOURNAL.* 2003;3:520-32.

[37] Cattell H, Jolley DJ. One Hundred Cases of Suicide in Elderly People. *British Journal of Psychiatry.* 1995;166:451-57.

[38] McIntosh JL. Suicide prevention in the elderly (age 65-99). *Suicide & Life-Threatening Behavior.* 1995;25(1):180-92.

[39] Pearson JL. Recent research on suicide in the elderly. *Curr Psychiatry Rep.* Feb 2002;4(1):59-63.

[40] Hawton K, Simkin S, Fagg J, Hawkins M. Suicide in Oxford University students 1976-90. *British Journaal of Psychiatry.* 1995;166:44-50.

[41] Silverman MM. Campus student suicide rates: fact or artifact? *Suicide & Life-Threatening Behavior.* 1993;23(4):329-42.

[42] Cotterill J, Cunliff W. Suicide in dermatological patients. *British Journal of Dermatology.* 1997;137(2):246-50.

[43] Di Maio L, Squitieri F, Napolitano G, Campanella G, Trofatter JA, Conneally PM. Suicide risk in Huntington's disease. *Journal of Medical Genetics.* 1993;30(4):293-95.

[44] Dell D, O'Brien B. Suicide in pregnancy. *Obstetrics & Gynecology.* 2003;102(6):1306-09.

[45] Bourgeois ML, Verdoux H. [Suicidal risk in bipolar disorders]. *Encephale.* 1997;23(Spec No 1):35-41.

[46] Hartmann PM. Strategies for managing depression complicated by bipolar disorder, suicidal ideation, or psychotic features. *Journal of the American Board of Family Practice.* 1996;9(4):261-9.

[47] Zatzick DF, Marmar CR, Weiss DS, et al. Posttraumatic Stress Disorder and Functioning and Quality of Life Outcomes in a Nationally Representative Sample of Male Vietnam Veterans. *American Journal of Psychiatry.* 1997;154(12):1690.

[48] Proctor S, Harley R, Wolfe J, Heeren T, White R. Health-related quality of life in Persian Gulf War Veterans. *Mil Med.* 2001;166(6):510-9.

[49] Cherry N, Creed F, Silman A, et al. Health and exposures of United Kingdom Gulf war veterans. Part I: The pattern and extent of ill health. *Occupational and Environmental Medicine.* 2001;58(5):291-98.

[50] Neylan TC, Marmar CR, Metzler TJ, et al. Sleep Disturbances in the Vietnam Generation: Findings From a Nationally Representative Sample of Male Vietnam Veterans155. *Am Psychiatric Assoc*; 1998:929-33.

[51] Skinner KM, Furey J. The focus on women Veterans who use Veterans Administration health care: The Veterans Administration women's health project. *Military medicine.* 1998;163(11):761-66.

[52] Weeks WB, Kazis LE, Shen Y, et al. *Differences in Health-Related Quality of Life in Rural and Urban Veterans94.* Am Public Health Assoc; 2004:1762-67.

[53] Barrett DH, Doebbeling CC, Schwartz DA, et al. Posttraumatic Stress Disorder and Self-Reported Physical Health Status Among US Military Personnel Serving During the Gulf War Period: A Population-Based Study. *Psychosomatics.* 2002;43(3):195.

[54] Ursano RJ, Norwood AE. *Emotional Aftermath of the Persian Gulf War: Veterans, Families, Communities, and Nations*: American Psychiatric Pub, Inc.; 1996.

[55] Shahtahmasebi S. The Good life: A holistic approach to the health of the population. *ScientificWorldJournal.* 2006;6:2117-32.

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 4

WAR AND DEPRESSION

Amra Zalihic and Dino Zalihic
Health Care Center Mostar, Bosnia and Herzegovina;
Mostar University, Mostar, Bosnia and Herzegovina

ABSTRACT

Some people say that depression feels like a black curtain of despair coming down over their lives. Many people feel like they have no energy and can't concentrate. Others feel irritable all the time for no apparent reason. The symptoms vary from person to person, but if some person feels "down" for more than two weeks, and these feelings are interfering with his/her daily life, he/she may be clinically depressed[1].

History has shown that the experience of deployment to war can have legacies that manifest themselves in a variety of physical and psychological health problems [2,3]. It is widely recognised that exposure to combat and other wartime experiences can have both short-term and long-term psychological effects [4]. War related imprisonment has been shown as a stressful event associated with the exhibition of higher rates and greater intensity of posttraumatic stress reactions, compared with war veterans who were not imprisoned. This indicates that wartime captivity produces stress residuals of considerable depth, range and persistence [5]. There is a strong indication that stressor characteristics influence the variety and number of exhibited intrusive, avoidance and arousal symptoms. Victims of rape tended to present with more avoidance symptoms and fewer hyperarousal symptoms, whereas former prisoners and veterans tended to report more hyperarousal symptoms. Rape victims and former prisoners also reported more symptoms than the other groups[5]. Groups suffering different types of trauma may show similarities in psychological dimensions of depression [5].

The prevalence of psychological effects after conflict suggest that traumatic exposure and resultant symptoms of posttraumatic stress disorder (PTSD) and depression can influence social functioning and how individuals perceive mechanisms aimed at promoting justice and reconciliation, such as amnesties, criminal trials, and truth commissions [6].

More than 90% of completed suicides are associated with mental or addictive disorders. These disorders provide the major context for suicide and suicidal behavior [7].

INTRODUCTION

A person who feels sad all the time, has unexplained crying spells, or loses interest in usual activities may have major depression, a serious medical illness that should be distinguished from normal temporary feelings of sadness [8]. Depression is a common mental disorder associated with poor health outcomes [9]. Depression has no single cause; often, it results from a combination of things. Whatever its cause, depression is not just a state of mind. It is related to physical changes in the brain, and connected to an imbalance of a type of chemical that carries signals in your brain and nerves (neurotransmitters) [10].

Some of the more common factors involved in depression are:

- Family history
- Trauma and stress
- Pessimistic personality
- Physical conditions
- Other psychological disorders [10]

Many traumatized individuals suffer from symptoms of depression, which is often associated with significant problems in social functioning [11,12]. Studies of the psychological impact of catastrophic events on survivors have demonstrated the existence of prolonged and sometimes devastating aftereffects of traumatic life experiences on individuals [13]. After the Vietnam War the concept of posttraumatic stress disorder was formally introduced to describe some of the psychological consequences of exposure to or witnessing of atrocities such as torture and killing [14]. The concept of post-traumatic stress disorder (PTSD) has arisen to describe the syndrome of intrusive thoughts, flashbacks, hyperarousal and numbing that can occur after exposure to any traumatic event, including those common in wartime [4].

Post-traumatic depression, reactional depression, major depressive disorder and post-traumatic stress disorder represent different clinical and nosographic disorders in despite of their occasionally common symptomatic core [15]. Historically, it is interesting to note during the XXth century the true semantic change of the terms of trauma from the somatic field to the psychic sphere. Physical traumatism is often represented by a material shock for the subject and by its organic consequences. It is defined as an event that leaves its mark which itself inflicts and handicaps the vital trajectory of the subject. It primarily comprises brain and rachis injuries, whose evolution is frequently characterized by the occurrence/appearance of a depressive disorder, whose genesis rests on psychological but also neurobiologic and physical arguments [15]. Thus major depressive disorders are often present in the course of various physical traumatisms mainly related to nervous system. In accordance with several studies, the prevalence of major depressive disorders ranges from 25% to 50%. These mood disorders occur in the year which follows the accidental event. Their average time of revelation is estimated at four months and their average duration lies between three and six months. Psychic traumatism doesn't have the same profile and rests for much dedicated with the reexperiencing. Thus for some authors, depression illness represents a disorder that occurs after a traumatic event whereas others see a differential diagnosis which exludes or which represents a comorbidity with post-traumatic stress disorder [15].

War is the ultimate in human aggression [16] and it is an extremely stressful event that creates an atmosphere of confusion and uncertainty, and forces participants to face possible injury, loss, and death. The combat environment, with its violence, physical demands, and separation from loved ones, may precipitate a wide range of emotional distress or psychiatric disorders. For example, as evidence of the emotional effects of the current war, 19.5% of an Army study group returning from Iraq reported perceiving they had a moderate or severe mental health problem [17,18]. In addition to the destruction to life, property and culture, it often inflict a less visible but deep and enduring toll in terms of psychological damage. Soldiers are expected to inflict the same brutal death and injury on the enemy[16].

The psychiatric differential diagnoses for military patients at war are broad. The clinical picture will vary over the course of a war, depending on several factors, including traumatic situation [19] and individual patient characteristics, available social supports, and the time elapsed since the precipitating event [18,19].

It is useful to consider the range of emotional responses in the context of the multiphasic traumatic stress response, dividing the course of mental health issues into three phases based on the length of time since the event(s) precipitating emotional distress [20]:

- An immediate phase, during or immediately after a traumatic event.
- A delayed phase, in the aftermath of combat.
- A chronic phase, months to years after a precipitating event.

Most people develop some form of acute stress reaction to traumatic event, but in the majority of cases the stress-related difficulties spontaneously withdraw once the person is removed from the situation [19].

Posttraumatic stress disorder is the primary war-related mental disorder seen in veterans returning from the Gulf [18]. Epidemiologic studies dealing with the risk of installation of a PTSD after a traumatic event reveal differences in the prevalence depending on the nature of the traumatic events: ranging from 1% in general population to 80% following some situations of extreme and durable psychic suffering [15]. According to the majority of authors, the co-occurrence of post-traumatic stress disorder and major depressive disorder is high although differential diagnosis is sometimes difficult. However, conceptual differences remain and two conceptions are distinguished [15]. However, other mental disorders may also occur and should be given appropriate consideration. Many soldiers reporting psychological symptoms will be at an age when first episodes of depression, mania, panic disorder, and schizophrenia also occur. It is easily conceivable that, in a person susceptible to a certain disorder, that disorder could be precipitated or exacerbated by the stresses of war. In addition, mental disorders such as depression may occur or worsen as a result of the effects of PTSD. Therefore, it is important to consider the full range of psychiatric disorders, not just PTSD [18].

It is now widely recognised that exposure to combat and other wartime experiences can have both short-term and long-term psychological effects [4]. A significant number of war veterans suffer from a wide range of debilitating psychological symptoms that very in duration. For some the symptoms are transient, while for others profound and prolonged psychological and somatic sequelae manifest in the form of posttraumatic stress disorder and other comorbid conditions [16]. Epidemiological and clinical studies have shown that war-

related posttraumatic stress disorder is frequently associated with other psychiatric disorders. The rata of comorbidity is especially high in combat-related PTSD. The most frequent comorbid disorders are major depressive disorder, generalized anxiety disorder, panic disorder, phobia, drug and alcohol abuse and personality disorders [21].

Increased rates of PTSD have often been reported after conflicts and can be attributed to the increased likelihood of psychologically traumatising events during wartime. The increased rates of other psychiatric symptoms might just be a consequence of the same process. There is evidence that psychologically traumatic events also lead to an increase in other psychological symptoms, particularly anxiety, in addition to the symptoms more specifically associated with the syndrome of PTSD [4]. Veterans with PTSD were also more likely to be clinically depressed than veterans without PTSD at the time of the assessment [11]. Also, the data suggest that depressive symptoms in individuals who have been severely traumatized are more severe when associated with a concurrent PTSD [22]. Comorbidity with PTSD, for example, is very common and poor psychological health has been shown previously in war veterans to persist for several decades after their war experiences [2]. The symptoms of PTSD are likely to produce affective and behavioral consequences consistent with poor relationship functioning. The tendency of PTSD suffers to avoid any emotionally changed situations could be a source of frustration for partners. Other symptoms such as emotional numbing and the increased risk of aggression also suggest relationships would suffer in a climate where one partners has PTSD [23].

Combat stress reaction is characterized by a large range of polymorphic and labile symptoms. Psychosomatic symptoms range from loss of bladder and bowel control, trembling, stuttering and vomiting to conversion reactions such as blindness and paralysis without organic causes. Cognitive symptoms include confusion, problems with perspective, memory and judgment, and disorientation. The main emotional symptoms are paralyzing anxiety and deep depression, which often alternate [16]. These symptoms may be important in maintaining the existence of their families or themselves. Big number of war veterans were retired or were not employed (35%) and war veterans and their children were also more often unemployed comparing to their civil copies [12,24,25]. Additionally, it found that veterans have more sleeping disorder [25,26] and nightmares than other [25,27]. Substance abuse was increased during crisis (war, emigrations, catastrophes, fear for existence etc). Benzodiazepins (BDZ) are most misused psychopharmaceuticals because of their easy availability [28], and in the majority of study confirmed heavy use of BDZ [25]. Also, psychological disturbance accompanied with exposure to trauma can be risk factor for further severness of opiates abuse [12,25,29].

Many studies report a high frequency of psychotic symptoms in combat veterans. This frequency ranges from 15% to 64%. On the other hand, others suggest that such cases are not numerous or that these symptoms related to the trauma and flashbacks. Several recently conducted studies confirm the existence of psychotic symptoms associated with war-related posttraumatic stress disorder. It has been observed that psychotic symptoms are symbolically related to trauma. They ate not-bizarre, typically reflect combat themes and guilt, and appear to be associated with major depression [21].

Several studies displayed results from self-reporting questioners of Gulf War veterans. These studies have shown higher than expected rates of psychiatric disorders and psychosomatic symptoms. Increased risk has been demonstrated for self-report of health care provider-diagnosed post- traumatic stress disorder (PTSD), symptom-based measures of

PTSD and posttraumatic stress reaction, psychological distress, symptoms suggestive of alcohol abuse and depression, including major depression, symptoms of chronic dysphoria and anxiety, and non-specific psychological symptoms such as memory and concentration difficulties, sleep disturbances and agitation [2]. Exposure to increasing numbers of Gulf War-related stressors was strongly associated with increasing risk for all psychological disorders [2].

Little is known about the long-term mental health of trauma-exposed refugees years after permanent resettlement in host countries [30,31]. Evidence is emerging that psychiatric disorders are common in populations affected by mass violence [32]. Studies report refugees to be at higher risk of psychiatric disorders such as depression, suicide, psychosis, posttraumatic stress disorder and substance misuse. Torture and civil wars before migration, and the experience of poverty, displacement, unemployment and racism in a host country may each contribute to the risk for developing psychiatric disorders. Clarifying the relative importance of pre- and post-migration risk factors offers opportunities to modify these and develop relevant preventive health policy. Cumulative pre-migration trauma is an independent risk factor for anxiety and depressive states, but not for psychoses. Specific traumatic events such as food shortages and being lost in a war situation were common, and were associated with higher levels of psychiatric symptoms [33]. This also suggests that the presence of anxiety and depression among refugees cannot always be explained on the basis of posttraumatic stress states even though they are common in such disorders [33,34].

In a population of Bosnian refugees who had recently fled from the war in Bosnia and Herzegovina, psychiatric comorbidity was associated with disability independent of the effects of age, trauma, and health status [31]. It found associations among depression, posttraumatic stress disorder (PTSD), and disability in a Bosnian refugee cohort [32].

Psychiatric morbidity was found to be highly prevalent in this study population of Guatemalan refugees living in Mexico 20 years after civil conflict: 11.8% met *DSM-IV* symptom criteria for PTSD, 54.4% had anxiety symptoms, and 38.8% had depression symptoms [35].

The rate of symptoms of depression found in this study, 38.8%, was comparable with other studies that used the HSCL-25. In the 1996 study by Allden et al [36] the rate of depression for Burmese refugees was 38% 4 to 5 years after refugee flight while the 1999 Mollica et al [31] study of Bosnian refugees using the HSCL-25 found a 39.2% estimated prevalence rate 1 to 2 years after exposure to trauma.

Refugees who live long-term in refugee camps in the developing world may experience traumatic stressors related to refugee camp life that are associated with high rates of psychiatric morbidity, economic stressors, or poor health [35].

Direct exposure to politically justified imprisonment qualifies as a traumatic experience, and many of its victims suffer from PTSD [37]. Political violence exposure was associated with symptoms of depression (36% of those exposed to political violence) and PTSD (18%), even after controlling for patient characteristics and recruitment site. Political violence exposure was also associated with reports of greater chronic pain, impaired physical functioning, and low scores of health related quality of life [38]. Diagnosis of PTSD stood out as the most common disorder in the former prisoners group. This finding validates the assumption that political persecution, combined with threats to life and to psychological and physical integrity, leads to overwhelming stress and in many cases to PTSD [37].

Exposure to chemical warfare is an extreme traumatic event that has long-lasting adverse consequences on mental health. Among individuals exposed to both high-intensity warfare and chemical weapons, prevalence rates for lifetime PTSD, current PTSD, major anxiety symptoms, and severe depressive symptoms were 59%, 33%, 65%, and 41%, respectively [39].

Table 1. War veterans from different regions and depression

Groups of veterans				**N^{o} of depression/all respondents**	**%**
1st groups	Army and Marine from Iraq and Army from Afganistan [17]		Army from Iraq 8 months	194/840	23,1
			Marine from Iraq	169/775	21,8
			Army from Afganistan	397/1885	21,06
2nd groups	Pre-Gulf war [2]		Australian veterans from Gulf War	32/1381	2,3
			Comparison group	35/1377	2,5
	Post-Gulf war		Australian veterans from Gulf War	225/1381	16,7
			Comparison group	152/1377	11,3
3rd groups	Military deployment [40]		Gulf veterans	146/967	15.1
			"Era" groups	61/784	7,8
4th groups	Soldiers who return from Iraq war [41]	Active participating soldiers	PDHA* 1	2003/56350	3,5
			PDHRA† 1	3485/56350	6,2
			PDHA 2	621/56350	1,2
			PDRHA	2346/56350	4,2
		National Guard and Reserve	PDHA 1	904/31885	2,9
			PDHRA 1	2338/31885	7,3
			PDHA 2	270/31885	0,9
			PDHRA 2	1795/31885	5,6
5th groups	Exposure to War-Related Violence in Northern Uganda [6]			1151/2585	44,5
6th groups	Latino immigrants [38]	Latino immigrants' experience of political violence in their country		101/281	35,9
		Latino immigrants without experience of political violence in their country		46/231	19,9

* PDHA- Post-Deployment Health Assessment

†PDHRA - Post-Deployment Health Re-Assessment

Wars have devastating effects on a nation's population as a whole but seem to affect women and men in different ways. Whereas men are often forced to fight and are frequently killed in wars, women's bodies can become battlegrounds where sexual violence becomes a weapon of war used to express power and to humiliate, dominate, or disrupt social ties among them. Several surveys have shown that women have experienced various forms of gender-based violent acts, such as forced pregnancy, abduction, rape, sexual slavery, and forced prostitution during wars [42].

Prolonged armed conflict may have a more devastating effect on the well-being of women than on men. Wars are associated with exacerbation of the incidence and prevalence of psychological distress, generally manifested in mood, anxiety, and impulse control disorders; posttraumatic stress disorder (PTSD) and increased use of tranquilizers. However, studies have shown that although women were less likely to directly experience traumatic

events, the odds of developing posttraumatic stress symptoms were six times higher in women than in men regardless of the level of terror exposure [42].

Existing research indicates that female veterans experience higher rates of trauma exposure in comparison to the general population. Emerging data also suggest that female veterans may be as likely to be exposed to combat as male veterans, although not as directly or as frequently. Female veterans also report high rates of posttraumatic stress disorder, which has been associated with poor psychiatric and physical functioning [43]. While veterans were traumatized directly by the war, their wives and families become indirect victims of the trauma [44]. Psychic trauma may create ripples which affect not only the victims themselves, but also those who are close to them [44]. Veterans' wives reported heightened levels of psychological maltreatment by their husbands [45].

Over 70% partners of PTSD veterans reported clinically significant levels of relationship distress compared to only about 30% of the non-PTSD couples. The degree of relationship distress was correlated with severity of veteran's PTSD symptoms, particularly symptoms of emotional numbing [46].

In the war zones, women suffered from the loss of property, uncertainty about the future, livelihood disruption, and difficulties in managing their daily lives, factors that have been shown to significantly affect mental health. Women in the war zones also reported more exposure to domestic violence. When traumatic events occur, it can be expected that women suffer psychologically [42].

In the study worked in Mostar, Bosnia and Herzegovina, found that wives of veterans with PTSD experienced depression more frequently than wives from the control group, while children older than 18 years did not differ in depression compared to controlled children [47]. It is obvious that living with traumatized persons significantly influences other family members, especially wives, who are expected to be empathic and to provide the greatest support to their ill husbands [47,48]. Previous research showed that close and long-term contact with an emotionally disturbed person may cause chronic stress. In time, this may lead to various emotional problems, such as higher levels of depressive symptoms and anxiety, problems in concentration, emotional exhaustion, pain syndromes and sleeping problems to the person providing the help [47,48].

Mothers' psychopathology was strong predictor of children's PTSD symptoms, while the opposite was not found. Traumatized mothers are at risk of transferring their fears, anxiety and other symptoms to their children, which in turn make them vulnerable to developing further mental health problems. This mechanism can sustain such problems in the future [49].

Exposure to traumatic experiences has been well established as a cause of posttraumatic stress disorder and other types of psychopathology among children and adults [49]. Research on the position of children during war shows that in comparison to the whole population, children are the most jeopardized group [50].

Every year, millions of children and adolescent are witnesses to or direct victims of traumatic events, including community violence, domestic violence, child maltreatment, suicide of loved ones, war, terrorism, etc [51]. *C*hildren's war experiences include the following: violent death of a parent, witnessing the killing of close family members, separation from parents and displacement, terror attacks, kidnapping and life threat, participation in violent acts, bombardment and shelling, witnessing parental fear reactions, physical injuries and handicaps as well as extreme poverty and deprivation [50]. Veterans'

combat exposure was positively correlated with hostility and violent behavior among children [45].

Based on research of children's reactions to stressors, such as natural and technological disasters, accidents, abuse and criminal activities divided all the trauma-stress reactions of children into two rough categories: Type I and Type II childhood traumas. Beside characteristics common to most cases of childhood trauma, Type I traumas include some specific features. These features refer to: strongly visualized or otherwise repeatedly perceived memories, repetitive behaviors, trauma-specific fears and changes in attitudes toward people, aspects of life and the future as well as features specific to variable, multiple, or long-standing traumas. Type II traumas are often manifested through absence of feeling, a sense of rage, or unremitting sadness, and may be diagnosed in childhood as conduct disorders, attention deficit disorders, depression or dissociative disorders. Children's trauma and stress-reactions induced by war events have all the predispositions of Type II trauma, because children are exposed to prolonged and repeated direct as well as indirect effects of war-related horrors.War events can have both short- and longterm effects [49,50,52].

The short-term stress/traumatic effects of war events on children refer to intrapersonal repetitions of the experience, fears and insecurities, emotional changes, regressed and disorganized behavior, precocious awareness, confusion and disorientation. All these effects are clearly related to a type of experienced traumatic event and depend upon the child's age [50].

The long-term stress/traumatic effects of war events on children may exist even for several years after the war has ended. Long-term war effects can be characterized by deviations in child development, changes in personality and identity, school failure, chronic problems in peer relations, poor physical health, a pessimistic view of the future, etc. One of the long-term effects of war on children is the manifestation of depressive symptoms. Depression affects all areas of child function including behavioral, emotional, somatic, and cognitive domains. Depression in children and adolescents is expressed as a cluster of symptoms that may include anhedonia, lowered self-esteem, social withdrawal, fatigue, impaired school performance, crying spells, sleeping and eating disturbances, and self-destructive impulses (American Psychiatric Association, 1987). The etiology of depressive disorders in childhood and adolescence is complex, and models of depression can be divided into two basic categories: biological and psychosocial. Depression involves the interaction of environmental factors and biological factors. Environmental factors include familial, interpersonal, extrafamilial events, and settings as well as catastrophic and traumatic events. Thus, one of the environmental factors related to depression in youngsters is a lack of social support [50].

Numerous studies, from differing cultures in different war zones around the world, have documented the effect on children of exposure to war atrocities [53].

All children experienced war trauma and many had psychological. Rates of mental health problems in children exposed to traumatic experiences have been reported to be as high as 40-50%, depending on measures used and diagnostic criteria [49]. It is known that massive exposure to wartime trauma overwhelms most psychological defense mechanisms in children, and that children may mitigate war effects in low-to-moderately intense wartime settings, which allows effective functioning after acclimatization [54]. Common symptoms and reactions in the aftermath of a traumatic event include sadness, anger, fears, numbness, feeling jumpy or jittery, moodiness or irritability, change in appetite, difficulty in sleeping,

nightmares, avoidance of situations that are reminders of the trauma, impairment of concentration, and guilt because of survival or lack of harm during the event [52].

Some studies aimed to identify mediating factors in the association between war trauma and other disorders among children [52]. Both the type and the amount of the exposure are important [52,53].

There is a positive and significant relationship between exposure and outcome in children, usually with respect to posttraumatic stress disorder, but also on relation to depression and anxiety [53].

Most children develop strong attachments to their parents, which become even stronger in adverse situations [52]. Separation and loss of one or both parents increase likelihood of various difficulties in children's psychological development [54]. Hasanovic at al [54] founded in their study a high level of co-morbidity between PTSD and depression among children exposed to war trauma who lost one or both parents.

The effects of war events were evident among boys and girls, but more pronounced in girls than boys [50]. The prevalence of conduct problems was greater among boys [55] and they suffer more from the long-term effects of war than girls [50]. Emotional problems were more common among girls [55]. In situations where children cannot be shielded from stressful events, such as war, a greater level of perceived social support is related to fewer depressive symptoms both for boys and girls in early adolescence [50]. Stressful events cause worries and concerns to the individual, influencing changes in both on individual's personality and the social surroundings [50].

Findings from Palestinian study suggest that the impact of political and armed conflict on Palestinian children is both severe and widespread [49]. Children who have not been direct victim of war, witnesses of bombardment or other violent acts, the vast majority experienced indirect trauma through watching television or hearing of killing through adults [49].

Table 2. War victims

War victims				**N^{o} of depression/ all respondents**	**%**
1st group [35]	Guatemala refugees in Mexico 20 year after			62/160	38,8%
2nd group	Bosnian refugees in Croatia [32]	1996.	Only depression	98/528	18,6
			Depression + PTSD	109/528	20,6
		1999.	Only depression	81/376	21,5
				46/376	12,2
3rd group	Cambodian refugees in USA 20 year after [30]			248/490	50,6
4th group	Children in Bosnia and Herzegovina [56]	Orphanage		11/38	28,9
		SOS children's village		15/48	31.3
		Lost one parent		10/50	20,0
		Had both parents		6/50	12,0
5th group	Women from Mostar (BH*)[47] score HSCL-25>1,75†	Husband has had PTSD		33/60	55
		Husband has not had PTSD		9/60	15
6th groups	Women from Bosnia and Croatia, victims of rape [56]	Depression		52/68	76,5
		Try of suicide		25/68	36,8

*BH- Bosnia and Herzegovina; †HSCL-25 Hopkins symptoms checklist -25 (individuals with scores on depression and/or total >1,75 are considered symptomatic

The risk factors for suicide can be classified as distal or proximal, and, within these broad categories, as sociodemographic, psychiatric, biological, familial, and situational. Mental and addictive disorders are the major risk factors for suicide in all age groups [7]. Distal risk factors represent the foundation upon which suicidal behavior is built. They represent a threshold that increases individual risk for later vulnerability to proximal risk factors. Distal risk factors are not limited to suicide but can produce multiple adverse physical and mental health outcomes. Their relationship to suicide is indirect; they are considered necessary, but not sufficient, for suicide to occur. Proximal risk factors, on the other hand, are those factors more closely associated with the suicide event itself. Distal and proximal risk factors can be loosely grouped into psychiatric, biological, familial, and situational. It is important to note that many individuals may have one or more risk factors and not be suicidal; on the other hand, the likelihood of suicide or suicidal behavior increases with an increasing number of risk factors. Mental and addictive disorders are central risk factors for suicide and suicidal behavior. Findings from psychological autopsy studies from the United States and Sweden indicate that more than 90% of completed suicides in all age groups are associated with mental or addictive disorders. Likewise, a psychiatric disorder is the strongest observed risk factor for attempted suicide in all age groups. Mental disorders are a necessary cause for suicide. Mental and addictive disorders provide the major context for suicide and suicidal behavior, and an understanding of these as underlying risk factors is fundamental to the understanding, prediction, and prevention of suicide [7].

There are a few articles about suicidal ideas in people who survived war. Suicide is connected with some psychical disorder, like PTSD or depression, or it has been happened in victims of concentration camp, like survives of the Holocaust. The studies addressing the association between the Holocaust experience and suicidality after the Holocaust range from a single case report to large scale studies as follows [57]. The first report to directly address the issue of suicide among Holocaust survivors and actually to emphasize the suicides that took place in the concentration camps was published only after 30 years had passed sincethe end of World War II [57]. Aging of survivors is frequently associated with depression, reactivation of traumatic syndromes, physical disorders, loss, and psychological distress, possibly increasing the risk of suicide [58].

Depression is an identified risk factor for suicidal ideation, a precursor for more serious suicidal behaviors. This risk might be further compounded in individuals who experience negative life events, including traumatic experiences, and those who might have comorbid illnesses[59]. The chronic stress produced by these traumatic events may have predisposed survivors to cope ineffectively as they age, thus resulting in suicidal ideation [59].

CONCLUSION

War and exposure to war, direct (Veterans, especial deployment, prisoners of war camps, victims of military sexual trauma) or indirect (refugees, victims of traumatic events) have significant influence on mental health and expansion of psychiatry illnesses, especially depression, posttraumatic stress disorder and anxiety. War Veterans from all war zones reported an increased prevalence of PTSD and common mental disorder [4]. War deployment was associated with an increased prevalence of mental disorders, psychological symptoms

and a lower quality of life beginning during the war and persisting long-time after [60]. The prevalence of depression and PTSD symptoms were very high among survivors. Depressed survivors had significantly worse psychologic and social functioning than depressed controls. Depressed survivors had more PTSD symptoms than nondepressed survivors, although it is unclear as to the causal direction of the relationship between depression and PTSD [61].

While veterans were traumatized directly by the war their wives and families become indirect victims of the trauma [44]. Exposure to war trauma impacts on both parents' and children's mental health, whose emotional responses are inter-related [52]. All children experienced war trauma and many had psychological consequences. The highest prevalence of PTSD, often comorbid with depression, was found among children who lost one or both parents. The children with the lowest rate of psychological disturbances were those living with both parents [54]. War-time rapes had deep immediate and long-term consequences on the mental health of women victims of rapes and their social and interpersonal functioning [56].

REFERENCE

[1] *http://www.depression.com/depression_basics.html (available 01.12.2008*.)

[2] Ikin JF, Sim MR, Creamer MC, Forbes AB, McKenzie DP, Kelsall HL, Glass DC, McFarlane AC, Abramson MJ, Ittak P, Dwyer T, Blizzard L, Delaney KR, Horsley KW, Harrex WK, Schwarz H. War-related psychological stressors and risk of psychological disorders in Australian veterans of the 1991 Gulf War. *Br J Psychiatry.* 2004;185:116-26.

[3] Hyams KC, Wignall S, Rosewell R. War syndromes and their evaluation: from the US Civil War to the Persian Gulf War. *Ann Intern Med.* 1996;125:398-405.

[4] Stimpson NJ, Thomas HV, Weightman AL, Dunstan F, Lewis G. Psychiatric disorder in veterans of the Persian Gulf War of 1991. Systematic review. *Br J Psychiatry.* 2003;182:391-403.

[5] Henigsberg N, Folnegović-Šmalc V, Moro LJ. Stressor characteristics and post-traumatic stress disorder symptoms dimensions in war victims. *Croat Med J.* 2001;42(5):543-50.

[6] Vinck P, Pham PN, Stover E, Weinstein HM. Exposure to war crimes and implications for peace building in northern Uganda. *JAMA.* 2007 1;298(5):543-54.

[7] Mościcki EK. Epidemiology of suicide. *Int Psychogeriatr.* 1995;7(2):137-48.

[8] Torpy JM, Burke AE, Glass RM. *JAMA* patient page. Depression. JAMA. 2008;300(18):2202.

[9] Black DW, Carney CP, Forman-Hoffman VL, Letuchy E, Peloso P, Woolson RF, Doebbeling BN. Depression in veterans of the first Gulf War and comparable military controls. *Ann Clin Psychiatry.* 2004;16(2):53-61.

[10] *http://www.depression.com/causes_of_depression.html (available: 01.12.2008*.)

[11] Hofmann SG, Litz BT, Weathers FW. Social anxiety, depression, and PTSD in Vietnam veterans. *J Anxiety Disord.* 2003;17(5):573-82.

[12] Nace EP, Meyers AL, O'Brien CP, Ream N, Mintz J. Depression in veterans two years after Viet Nam. *Am J Psychiatry.* 1977;134(2):167-70.

[13] Rosenheck R. Impact of posttraumatic stress disorder of World War II on the next generation. *J Nerv Ment Dis.*1986;174(6):319-27.
[14] van IJzendoorn MH, Bakermans-Kranenburg MJ, Sagi-Schwartz A. Are children of Holocaust survivors less well-adapted? A meta-analytic investigation of secundary traumatization. *J Trauma Stress* 2003;16(5):459-69.
[15] Ducrocq F, Vaiva G, Cottencin O, Molenda S, Bailly D. Post-traumatic stress, post-traumatic depression and major depressive episode: literature. *Encephale.* 2001;27(2):159-68.
[16] Solomon Z. The impact of posttraumatic stress disorder in military situations. *J Clin Psychiatry*. 2001;62(17):11-5.
[17] Hoge CW, Castro CA, Messer SC, McGurk DM, Cotting DI, Koffman RD. Combat duty in Afghanistan, mental health problems, and barriers to care. *N Engl J Med.* 2004;351:13-22.
[18] Reeves RR, Parker JD, Konkle-Parker DJ. War-related mental health problems of today's veterans: new clinical awareness. *J Psychosoc Nurs Ment Health Serv.* 2005;43(7):18-28.
[19] Begic D, Jokic-Begic N. Heterogenity of posttraumatic stress disorder symptoms in Croatian war veterans: retrospective study. *Croat Med J.* 2007;48:133-9.
[20] Cozza SJ, Benedek DM, Bradley JC, Grieger TA, Nam TS, Waldrep DA. *Topics specifi c to the psychiatric treatment of military personnel*. In Schnurr PP, Cozza SJ, Editors. Iraq War clinician guide. 2nd ed. White River Junction, VT: National Center for Posttraumatic Stress Disorder, Department of Veterans Affairs. 2004.p. 4-20.
[21] Ivezic S, Bagaric A, Oruc L, Mimica N, Ljubin T. Psychotic symptoms and combat psychiatric disorders in Croatian combat-related posttraumatic stress disorder patients. *Croat Med J.*2000;41(2):179-82.
[22] Yehuda R, Kahana B, Southwick SM, Giller EL Jr. Depressive features in Holocaust survivors with post-traumatic stress disorder. *J Trauma Stress.* 1994;7(4):699-704.
[23] Evans L, McHugh T, Hopwood M, Watt C. Chronic posttraumatic stress disorder and family functioning of Vietnam veterans and their partners. *Aust N Z J Psychiatry.* 2003;37(6):765-72.
[24] Davidson AC, Mellor DJ. The adjustment of children of Australian Vietnam veterans: is there evidence for the transgenerational transmission of the effects of war-related trauma? *Aust N Z J Psychiatry* 2001;35(3):345-51.
[25] Zalihic A, Skobic H, Pejanovic-Skobic N. Case-control study: posttraumatic stress disorder and habits of war veterans. *Psychiatr Danub.* 2008;20(1):75-9.
[26] Maher MJ, Rego SA, Asnis GM. *Sleep disturbances in patients with post-traumatic stress disorder: epidemiology, impact and approaches to management*. CNS Drugs 2006;20(7):567-90.
[27] Raskind MA, Peskind ER, Hoff DJ, Hart KL, Holmes HA, Warren D, Shofer J, O'Connell J, Taylor F, Gross C, Rohde K, McFall Me. A parallel group placebo controlled study of prazosin for trauma nightmares and sleep disturbance in combat veterans with posttraumatic stress disorder. *Biol Psychiatry*. 2007;61(8):928-34.
[28] Davidson JR. Use of benzodiazepines in social anxiety disorder, generalized anxiety disorder and posttraumatic stress disorder. *J Clin Psychiatry* 2004;65(5):29-33.
[29] Clark HW, Masson CL, Delucchi KL, Hall SM, Sees KL. Violent traumatic events and drug abuse severity. *J Subst Abuse Treat* 2001;20(2):121-7.

[30] Marshall GN, Schell TL, Elliott MN, Berthold SM, Chun CA. Mental health of Cambodian refugees 2 decades after resettlement in the United States. *JAMA.* 2005;294(5):571-9.

[31] Mollica RF, McInnes K, Sarajlić N, Lavelle J, Sarajlić I, Massagli MP. Disability associated with psychiatric comorbidity and health status in Bosnian refugees living in Croatia. *JAMA.* 1999;282(5):433-9.

[32] Mollica RF, Sarajlic N, Chernoff M, Lavelle J, Vukovic IS, Massagli MP. Longitudinal study of psychiatric symptoms, disability, mortality, and emigration among Bosnian refugees. *JAMA.*2001;286(5):546-54.

[33] Bhui K, Abdi A, Abdi M, Pereira S, Dualeh M, Robertson D, Sathyamoorthy G, Ismail H. Traumatic events, migration characteristics and psychiatric symptoms among Somali refugees-preliminary communication. *Soc Psychiatry Psychiatr Epidemiol.* 2003;38(1):35-43.

[34] Cox BJ, Clara IP, Enns MS. Posttraumatic stress disorder and the structure of common mental disorders. *Depress Anxiety.* 2002;15(4):168–71.

[35] Sabin M, Lopes Cardozo B, Nackerud L, Kaiser R, Varese L. Factors associated with poor mental health among Guatemalan refugees living in Mexico 20 years after civil conflict. *JAMA.*2003;290(5):635-42.

[36] Allden K, Poole C, Chantavanich S, Ohmar K, Aung N, Mollica R. Burmese political dissidents in Thailand: trauma and survival among young adults in exile. *Am J Public Health.* 1996;86:1561-569.

[37] Maercker A, Schützwohl M. Long-term effects of political imprisonment: a group comparison study. *Soc Psychiatry Psychiatr Epidemiol.* 1997;32(8):435-42.

[38] Eisenman DP, Gelberg L, Liu H, Shapiro MF. Mental health and health-related quality of life among adult Latino primary care patients living in the United States with previous exposure to political violence. *JAMA.* 2003;290(5):627-34.

[39] Hashemian F, Khoshnood K, Desai MM, Falahati F, Kasl S, Southwick S. Anxiety, depression, and posttraumatic stress in Iranian survivors of chemical warfare. *JAMA.* 2006;296(5):560-6.

[40] Fiedler N, Ozakinci G, Hallman W, Wartenberg D, Brewer NT, Barrett DH, Kipen HM. Military deployment to the Gulf War as a risk factor for psychiatric illness among US troops. *Br J Psychiatry.* 2006;188:453-9.

[41] Milliken CS, Auchterlonie JL, Hoge CW. Longitudinal assessment of mental health problems among active and reserve component soldiers returning from the Iraq war. *JAMA.* 2007;298(18):2141-8.

[42] Usta J, Farver JA, Zein L. Women, war, and violence: surviving the experience. *J Womens Health (Larchmt).* 2008;17(5):793-804.

[43] Zinzow HM, Grubaugh AL, Monnier J, Suffoletta-Maierle S, Frueh BC. Trauma among female veterans: a critical review. *Trauma Violence Abuse.* 2007;8(4):384-400.

[44] Solomon Z. The impact of war stress on veterans families. 1998; *www.ffzg.hr/hsd/polemos/drugi/2.html* (available 25.11.2006.)

[45] Glenn DM, Beckham JC, Feldman ME, Kirby AC, Hertzberg MA, Moore SD. Violence and hostility among families of Vietnam veterans with combat-related posttraumatic stress disorder. *Violence Vict.* 2002; 17(4):473-489.

[46] Riggs DS, Byrne CA, Weathers FW, Litz BT. The qualiti of the intimate relationships of male Vietnam veterans: problems associated with posttraumatic stress disorder. *J Trauma Stress* 1998;11(1):87-101.

[47] Zalihić A, Zalihić D, Pivić G. Influence of posttraumatic stress disorder of the fathers on other family members. *Bosn J Basic Med Sci*. 2008;8(1):20-6.

[48] Frančišković T., Stevanović A., Jelusić I., Roganović B., Klarić M., Grković J. Secondary traumatization of wives of war veterans with posttraumatic stress disorder. *Croat. Med. J*. 2007;48:177-184.

[49] Thabet AA, Abed Y, Vostanis P. Effect of trauma on the mental health of Palestinian children and mothers in Gaza strip. *Eastern Mediterranean Healt J.* 2001;7(3):413-21.

[50] Brajsa-Zganec A. *Child Abuse & Neglect*. 2005; 29:31–43.

[51] Brown EJ. Clinical characteristics and efficacious treatment of stress disorder in children and adolescents. *Pediatr Ann* 2005;34(2):138-46.

[52] Thabet AA, Abu Tawahina A, El Sarraj E, Vostanis P. Exposure to war trauma and PTSD among parents and children in the Gaza strip. *Eur Child Adolesc Psychiatry.* 2008;17(4):191-9.

[53] Smith P, Perrin S, Yule W, Rabe-Hesketh S. War exposure and maternal reactions in the psychological adjustment of children from Bosnia-Herzegovina. *J Child Psychol. Psychiat.* 2001;42(3):395-404.

[54] Hasanović M, Sinanović O, Selimbašić Z, Pajević I, Avdibegović E. Psychological disturbance of war-traumatized children from different foster and family settings in Bosnia and Herzegovina. *Croat Med J*. 2006;47:85-94.

[55] Eapen V, Swadi H, Sabri S, Abou-Seleh M. Childhood behavioural disturbance in community sample in Al-Ain, United Arab Emirates. *East Mediterr Health J.* 2001;7(3):428-34.

[56] Loncar M, Medved V, Jovanović N, Hotujac L. Psychological consequences of rape on women in 1991-1995 war in Croatia and Bosnia and Herzegovina. *Croat Med J.* 2006;47(1):67-75.

[57] Barak Y. The aging of Holocaust survivors: myth and reality concerning suicide. *Isr Med Assoc J.* 2007;9(3):196-8.

[58] Barak Y, Aizenberg D, Szor H, Swartz M, Maor R, Knobler HY. Increased risk of attempted suicide among aging holocaust survivors. *Am J Geriatr Psychiatry.* 2005;13(8):701-4.

[59] Clarke DE, Colantonio A, Heslegrave R, Rhodes A, Links P, Conn D. Holocaust experience and suicidal ideation in high-risk older adults. *Am J Geriatr Psychiatry.* 2004;12(1):65-74.

[60] Toomey R, Kang HK, Karlinsky J, Baker DG, Vasterling JJ, Alpern R, Reda DJ, Henderson WG, Murphy FM, Eisen SA. Mental health of US Gulf War veterans 10 years after the war. *Br J Psychiatry.* 2007;190:385-93.

[61] Trappler B, Cohen CI, Tulloo R. Impact of early lifetime trauma in later life: depression among Holocaust survivors 60 years after the liberation of Auschwitz. *Am J Geriatr Psychiatry.* 2007;15(1):79-83.

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 5

MENTAL DISORDER, WAR AND SUICIDE

Časlav Lončar and Tomislav Franić
University Hospital Split, Split, Croatia

ABSTRACT

Suicide was found to be significantly associated with different mental disorders, and people who suffer from mental disorder are more likely to attempt or commit this act. The war also was found to have impact on suicide rates. Patients who were hospitalized in any time of their live might represent distinct vulnerable group because of intensity of their disorder or lack of social network. Possible associations of war and suicide in this group of patients were in focus of this work. The association of war period with higher suicide rate in both genders was found with significantly stronger impact in females.

INTRODUCTION

Suicide is an anthropological-cultural phenomenon determined by bio-psychological-social factors. Although the suicide is not exclusive act of mentally ill people there is consensus that people with diagnosable mental disorder or at least with psychological disturbances kill themselves more often then the rest of the population [1]. Several studies indicate that the suicide risk of mental patients is 20 times higher than with the rest of the population [2-4]. The relationship between mental disorder and suicide depends on the type and number of disorder [3], co morbidity, the disease duration, prescribed psycho pharmaceutical drugs and social factors [2, 4-6].

Appelby [7] conducted research on 7,921 mental patients through an 18-year-monitoring period, it was found that the suicide rate for men is 11.4 and for women is 13.7.

The most threatened groups of patients were those suffering from: schizophrenia, affective disorders, personality disorders and drug addiction [7].

A wide range of possible risks, protective and correlated factors for suicide were assessed worldwide and there are numerous comprehensive texts on this topic [1, 8-10].

THE 1991-1995 HOMELAND WAR AND SUICIDE

Major social changes and catastrophic events surely disarrange many factors that may have positive or negative association with suicide. Croatian society went through such a process, the 1991-1995 Homeland War. It is estimated that at least 1,000,000 people were exposed to direct war stress and even more were secondarily traumatized [11].

In prior research it was reported that the suicide rate in general population is lower during war times [12-19]. Opposite to these findings some similar research done in Croatia has shown an increase in the frequency of suicide in general population during times of war [20-24]. The increase in suicide rate in the wartime was mostly due to the increase in number of suicide victims younger than 40 years. This was explained by the greater accessibility of firearms to younger population which were military involved. In support of this hypothesis stands the higher number of suicides by firearms as result of greater quantities of arms and the laxity of control in arming individuals during the war[21]. After the war time there was significant drop-out in frequency of suicides in males and also a trend of evident decrease in total suicide rate [21, 23]

Why do people with mental disorders kill themselves more often, what affects the frequency and other characteristics of their suicide and is there any impact of war?

Taking into consideration these differences in the results of research in general population, it was important to conduct research on the influence of Homeland war on suicides of people with mental disorders to se is there similar trends.

In conducting this study, we aimed to achieve a better understanding of the complexity of suicide among mental patients within the atmosphere of war. Because suicide is not patognomonic for any distinct mental disorder and since history of hospitalization for psychiatric disorder is associated with the highest attributable risk for suicide [10] we investigated suicide risk and characteristics in patients with at least one psychiatric hospitalization for any diagnosis. The overall description of research methodology is published elsewhere [25].

The research was conducted in the territory of the 17th county of the Republic of Croatia, namely Split-Dalmatia County. This geographical area covers 4,501 km^2, which is 8% of the territory of the Republic. According to the 1991 population census, the County has a population of 474,019 inhabitants (9.9% of the population of Croatia), out of which 233,195 (49.2%) are males and 240,824 (50.8%) are females [25].

Autopsy reports of the Department of Pathology and Forensic Medicine of the Clinical Hospital Split and the materials of the Provincial Court and State Attorney's Office in Split were used, also the Statistical yearbook of Croatian National Institute of Public Health of Split-Dalmatia County (for population census and incidence of particular diseases data from the *Croatian Bureau of Statistics,* statistical reports of the Split-Dalmatia County Office of Statistics. Hospital charts for all hospital treated patients were reviewed.

The research included all patients treated at the Clinic for Psychiatry at the Clinical Hospital Split during the nine-year timeframe which were divided into pre-war (April 6th 1988 - April 7th 1991), wartime (April 6th 1991-April 7th 1994) and post-war (April 6th 1997-April 7th 2000) periods. The total number of patients was 16,362 (10,713 men and 5,649 women). All patients who were treated during the three observed periods, according to 10-th International Classification of Diseases (ICD-10), and who committed suicide were analyzed.

During this period (9 years) suicide was committed by 78 hospital treated patients. Out of the total number of 78 mental patients there were 43 (55%) men and 35 (45%) women. In the overall population of the country, 590 people committed suicide during this period.

The average age of hospital treated suicide victims was 42.2 for males, 48.5 for females in pre-war time; 45.4 for men and 49.4 for women in war time and 40.3 in men and for women 47.0 in post-war time. This is in contrast with findings in general suicide population [21].

During the pre-war period, 4,681 patients were treated in hospital, out of which 2,670 (57%) were men and 2,011(43%) were women. During the war period 5,250 patients were treated, out of which 3,592 (68%) were men and 1,658 (32%) were women. Finally, during the post-war period 6,431 patients were treated, out of which 4,451(69%) were men and 1,980 (31%) were women. The suicide rate in the group of treated patients for all three periods and both genders taken together was 4.6 per 1,000 treated patients. This incidence was 4.2 among men and 5.3 among women. For all three periods combined, we can conclude that the incidence of suicides among women treated at the hospital was statistically higher than that of men which is contrary to available data for overall population of suicide victims [21, 24]

In examining the differences across these three time periods, we found that the incidence of suicide per 1,000 treated patients during the pre-war period was 4.7; during the war time period, 6.8; and during the post-war period, 2.9. This difference is statistically significant with the incidence of suicide being highest in the war time period and lowest in postwar time.

The suicide incidence among women per 1,000 hospital treated patients in the hospital during the pre-war period was 3.9; during the war period, 7.5; and during the post-war period, 4.3.

The suicide incidence among men per 1,000 treated during the pre-war period was 5.3; during the war period, 6.2; and during the post-war period, 2.2. There is a statistically significant difference in the incidence of suicides between the three observed periods with the greatest rate for both genders in war time. The highest rate was observed for females during the war with drop-out after the war but still greater rate compared to pre-war time unlike males which post-war suicide rate was lower than pre-war.

Regarding ICD diagnoses and suicide rate there were no any association with any observed time period for codes F 20-29 (Schizophrenia and schizotipical disorders) and code F30-39 (affective disorders)**.** Only people treated for disorders coded in ICD category F 40-49 (Neurotic and stress related disorders) were found to kill themselves statistically more often in war time.

Our study examined numerous socio-demographic characteristics of hospital treated suicide victims in comparison with rest of suicide victims and comparison of hospital treated group across three periods. A comparison with rest of suicide victims is beyond the scope of this article but is available from authors. These list include: the means of committing suicide; season, week or day time of committing suicide; marital status; number of children; urban or rural place of living; educational status; employment status; income; housing; family structure; relationship with partner; relationship with children; relationship with other inmates; relationship and existence of conflict with environment; family structure in childhood and adolescence; existence of mental disorder or suicide in family; alcohol intoxication in time of suicide; number of hospitalization; duration of illness; time from last hospitalization to time of suicide; asking for professional help in last month of life; psycho pharmacotherapy compliance, previous suicide attempts and suicide announcement.

Regarding means of committing suicide only suicide by drowning was significant more frequent in war time which could be associated with higher number of female suicides in that period and known inclination of females to this method [24]. As expected intoxication with medicaments was often across all observed times because of already prescribed therapy, but it was surprisingly to find no differences in using firearms which is in contrast with the rest of suicide population [21, 24]. More then half of suicide victims during the period of war commit suicide in autumn which is significant, there were no differences regarding week or day time. We found no differences in marital status, number of children, rural place of living, employment status and housing. There is a trend for people with 12 years of education or less to commit suicide more often in war period than in pre-war time, but this trend could not be exclusive war associated, because it continues after the war. During the war there were more hospital treated suicide victims among those living in urban areas, and those living alone without family.

Relationship with partner, relationship with children, relationship with other inmates, relationship and existence of conflict with environment also had shown no differences across three observed periods.

Regarding family structure in childhood and adolescence; existence of mental disorder or suicide in family there were no association with war.

Alcohol intoxication in time of death was found to be significant only for post-war period.

Number of hospitalization; duration of illness; time from last hospitalization to time of suicide; asking for professional help in last month of life; psycho pharmacotherapy compliance, previous suicide attempts and suicide announcement had shown equally association in all observed time.

Examples of reductions in suicide rates in times of war have been described for several time periods and cultures [12-19]. It was hypothesized that during the conditions of war, societies experience a mobilization of inner forces, a strengthening of social integration and social regulation, and that fewer suicides occur [19]. In his research on suicide, Durkheim notes the decline in the number of suicides in the general population during times of national political crisis and war, as well as during other types of crisis [16].

In contrast to established view, investigations of recent Croatian war experience and association with suicide in general did not confirmed this notion [21, 24]. It could be result of cultural differences [26], socioeconomic change in concurrent major socio-economic changes in transition from socialism to capitalism and transition from sociocentric to egocentric personality [27, 28]

CONCLUSION

In conclusion to results of our experience it seems that suicide victims which were hospital treated for any psychiatric reasons at any time of their lives represents distinct category in terms of characteristics of suicide. The findings of this study are cross sectional and do not offer clear causal relationship. Many of association could be simply the result of selection of population with intense psychical disturbances or weak social support so they

need hospitalization. Nevertheless there are some findings clearly related exclusively with war period.

The main results of our research show that there is significant association of war period and higher suicide rate in both genders with significantly stronger impact in females. Another striking finding is higher female suicide rate in all observed periods. Although there is greater accessibility of firearms in war time it has no impact in observed sample.

In this research we have tried to analyze why the mentally ill patients we observed committed suicide. We looked for answers based upon our results, and we came to the conclusion that the decisive role of the suicides of people with mental disorders is not explained only to the mental disease itself. What might be of relevance when making the decision to commit suicide and then committing suicide might be: a kind of resignation to one's fate, escape from pain or withdrawal from unbearable suffering, loss of hope that things can get better, refusing to be a burden to people around them, a revenge on the people around them who are emotionally exhausted and are keeping an increasing distance from the person suffering from the mental disorder, choice and dose of psycho pharmaceutical drugs and the quality and frequency of hospital treatments.

War as a natural disaster of high significance has led to an increase in the number of suicides of people suffering from mental disorders, which once again indicates to the multidimensionality of the problem.

This research might help towards developing a better understanding of the suicides of people suffering from mental disorders with emphasis on gender specific approach.

REFERENCES

[1] Simon I, Hales E, eds. *Textbook of Suicide Assessment and Management.*Washington, DC: The American Psychiatric Publishing, 2006

[2] Beautrais AL, Joyce PR, Mulder RT, Fergusson DM, Deavoll BJ, Nightingale SK: Prevalence and comorbidity of mental disorders in persons making serious suicide attempts: a case-control study. *Am J Psychiatry* 1996; 153(8):1009-14.

[3] Joukamaa M, Heliovaara M, Knekt P, Aromaa A, Raitasalo R, Lehtinen V: Mental disorders and cause-specific mortality. *Br J Psychiatry* 2001; 179:498-502.

[4] King E: Suicide in the mentally ill. An epidemiological sample and implications for clinicians. *Br J Psychiatry* 1994; 165(5):658-63.

[5] Harris EC, Barraclough B: Excess mortality of mental disorder. *Br J Psychiatry* 1998; 173:11-53.

[6] Appleby L, Thomas S, Ferrier N, Lewis G, Shaw J, Amos T: Sudden unexplained death in psychiatric in-patients. *Br J Psychiatry* 2000; 176:405-6.

[7] Appleby L: Suicide in psychiatric patients: risk and prevention. *Br J Psychiatry* 1992; 161:749-58.

[8] Maris RW: Suicide. *Lancet* 2002; 360(9329):319-26.

[9] Mann JJ, Waternaux C, Haas GL, Malone KM: Toward a clinical model of suicidal behavior in psychiatric patients. *Am J Psychiatry* 1999; 156(2):181-9.

[10] Qin P, Agerbo E, Mortensen PB: Suicide risk in relation to socioeconomic, demographic, psychiatric, and familial factors: a national register-based study of all suicides in Denmark, 1981-1997. *Am J Psychiatry* 2003; 160(4):765-72.
[11] Kozaric-Kovacic D, Kocijan-Hercigonja D, Jambrosic A: Psychiatric help to psychotraumatized persons during and after war in Croatia. *Croat Med J* 2002; 43(2):221-8.
[12] Moens GF, van Oortmarssen GJ, Honggokoesoemo S, van de Voorde H: Birth cohort analysis of suicide mortality in Belgium 1954-1981 by a graphic and a quantitative method. *Acta Psychiatr Scand* 1987; 76(4):450-5.
[13] Pounder DJ: Why are the British hanging themselves? *Am J Forensic Med Pathol* 1993; 14(2):135-40.
[14] Lester D: The effect of war on suicide rates. A study of France from 1826 to 1913. *Eur Arch Psychiatry Clin Neurosci* 1993; 242(4):248-9.
[15] Somasundaram DJ, Rajadurai S: War and suicide in northern Sri Lanka. *Acta Psychiatr Scand* 1995; 91(1):1-4.
[16] Durkheim E. *Suicide: a study in sociology* New York:Free Press, 1951.
[17] Henderson R, Stark C, Humphry RW, Selvaraj S: *Changes in Scottish suicide rates during the Second World War.* BMC Public Health 2006; 6:167.
[18] Murphy E, Lindesay J, Grundy E: 60 years of suicide in England and Wales. A cohort study. *Arch Gen Psychiatry* 1986; 43(10):969-76.
[19] Rojcewicz S: War and suicide. *Life threat Behav* 1971; 1:46-54.
[20] Bosnar A, Stemberg V, Zamolo G, Stifter S: Increased suicide rate before and during the war in southwestern Croatia. *Arch Med Res* 2002; 33(3):301-4.
[21] Bosnar A, Stemberga V, Coklo M, Koncar GZ, Definis-Gojanovic M, Sendula-Jengic V, Katic P: Suicide and the war in Croatia. *Forensic Sci Int* 2005; 147 Suppl:S13-6.
[22] Bosnar A, Stemberga V, Cuculic D, Zamolo G, Stifter S, Coklo M: Suicide rate after the 1991-1995 War in Southwestern Croatia. *Arch Med Res 2*004; 35(4):344-7.
[23] Jakovljevic M, Sedic B, Martinac M, Marcinko D, Ljubicic D, Vukusic H: Update of suicide trends in croatia 1966-2002. *Psychiatr Danub* 2004; 16(4):299-308.
[24] Definis - Gojanovic M. *The impact of the war on number and character of murders and suicides in Split-Dalmatia County.* Zagreb: Zagreb School of Medicine, 1998
[25] Loncar C, Definis-Gojanovic M, Dodig G, Jakovljevic M, Franic T, Marcinko D, Mihanovic M: War, mental disorder and suicide. *Coll Antropol* 2004; 28(1):377-84.
[26] Weiss JM, Perry ME: Transcultural attitudes toward homocide and suicide. *Suicide* 1975; 5(4):223-7.
[27] Lucey S, Corcoran P, Keeley HS, Brophy J, Arensman E, Perry IJ: Socioeconomic change and suicide: a time-series study from the Republic of Ireland. *Crisis* 2005; 26(2):90-4.
[28] Wendler S, Matthews D, *Cultural Competence in Suicide Risk Assessment, in Textbook of Suicide Assessment and Management*, I. Simon, E. Hales, Editors.Washington, DC: The American Psychiatric Publishing, 2006.

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 6

THEY ALSO SERVE WHO ONLY STAND AND WAIT: SUICIDE IN WARTIME CIVILIAN POPULATIONS

Wally Barr
University of Liverpool, Liverpool, United Kingdom

ABSTRACT

This chapter reviews the international literature on suicide in wartime civilian populations and outlines common themes found across many different cultures. Variations in suicide rates are described and the discussion incorporates a critique of the major theoretical models offered to explain the dynamic behind these observed changes. Some of the weaknesses in the current literature are outlined along with an assessment of the obstacles and difficulties frequently encountered by researchers in seeking to gather and analyse accurate suicide data at times of war.

INTRODUCTION

There is strong evidence that natural disasters, such as floods and earthquakes, are associated with reductions in local suicide rates (1,2). However, the terror, grief and social disruption brought about by these events is frequently accompanied by a sense of purpose, belonging and communal unity in the face of the 'common enemy' represented by the disaster. These very human reactions appear to be no less evident in times of war, when members of a community or society perceive themselves to be threatened and collectively charged with a shared purpose to face their common enemy. In these circumstances we should not be surprised to find a reduction in the local suicide rate, much as we would expect in the event of a natural disaster, and there is considerable evidence that this is so, at least in the civilian population (3,4). However, this finding is not universal. There have been a number of occasions when researchers have reported an *increase* in suicide rates at times of war (5,6). Yet other studies have reported that, while suicide rates may rise, this is not necessarily a direct result of war per se; rather, the relationship between war and suicide is mediated by other factors (7). It is clear, then, that the association between war and suicide in

the civilian population is rather more complex than appears at first sight, and this complexity has led to the development of a number of theoretical models to account for the variation in findings.

THEORETICAL MODELS OF SUICIDE IN WARTIME

Most notable among all theoreticians has been the French sociologist Emile Durkheim (1858-1917). In his classic work, *Le Suicide* (8), Durkheim observes that a decline in suicide rates generally occurs in times of war, though these increase again when hostilities cease (9). This conclusion arose from analyses he conducted of periods of conflict in a number of European countries in the latter half of the nineteenth century, and supports his contention that wars typically increase the level of social integration in a society because members will group together in mutual support against a common enemy. When social integration increases, Durkheim argued, there will be a reduction in the level of egoistic suicide (this being the type of suicide that occurs more frequently when the level of social integration in a society is weak). However, Durkheim made allowances for variations in different situations, holding that only a particular kind of war, a great national war, will be associated with decreases in the suicide rate. 'Political wars' that do not unite and excite ordinary members of society would not be expected to lower the suicide rate and in fact may increase suicides. Durkheim's concept of social integration is one of two factors in his model of the social bond that individuals experience in society. The other factor is social regulation, which is the extent of an individual's attachment to society's norms. Fundamental to the model of suicide he developed was the belief that suicide rates may increase when extremes occur in either of these two factors.

Despite the fact that he was writing over 100 years ago, many of Durkheim's findings and models of suicidal behavior are still of relevance today. However, other commentators have suggested more psychoanalytic processes are relevant in wartime. Henry and Short, for example, observed over 50 years ago that both suicide and homicide can be seen as expressions of aggression (10). They argued that in times of war suicide rates fall because homicide rates, in the form of killing the enemy, rise. In this way a relatively constant level of aggression is maintained but is expressed differently, through homicide rather than through suicide. The extent to which this model applies to the civilian population rather than the military population, remains open to debate however. Others have suggested that wartime suicide rates may largely be a function of the economic activity generated by war, and have argued that it is this, rather than social/political integration, that leads to a decline in the suicide rate. This claim, that economic or other intervening factors such as unemployment are responsible for observed changes in the suicide rate during war, is supported by a growing body of evidence. For example, despite some points of debate, evidence from systematic reviews has demonstrated a significant positive association between unemployment and suicide (e.g. 11,12).

Marshall (13) has argued that the total effect of war on the suicide rate is determined by a mix of the direct effects of political integration or the expression of aggression by homicide, and the indirect effect of war's impact on suicide via its influence on economic activity. He goes on to note that a true measure of the direct effect of war on suicide requires that the

economic activity generated by war should be held constant. Durkheim's model, that the suicide rate in war should fall in the case of a great national war and stabilise or rise in a political war, therefore differs from both this economic model and that of Henry and Short, whose model of war as an aggression outlet predicts that *any* war will be associated with a fall in the suicide rate. Clearly these models, and other related explanations, are capable of empirical testing and it is to this that we now turn.

EMPIRICAL EVIDENCE FOR THE EFFECT OF WAR ON CIVILIAN SUICIDE RATES

War is Associated with a Decline in Suicide Rates

Reductions in suicide rates have been reported by a number of studies based on data from different theaters of war at different periods of time. For example, in data from both the First and Second World War Lester found evidence of a significant decrease in male suicide rates, but no comparable change in females (14). Grubisić-Ilić and colleagues (15) examined the characteristics of suicide in Croatia before, during and following the conflict between 1985-2000. They found that in the areas of the country most affected by the war the suicide rate was lower in wartime than in the areas only indirectly affected by war (17.74 vs 19.70 per 100,000). The position was reversed in the post-war period, however, when the suicide rate was higher in the areas most directly affected by war. They believe this position can be explained by Durkheim's theory since a defensive war can strengthen social integration and so lead to a reduction in the suicide rate.

The conflict in Sri Lanka, which was especially marked in 1987, was somewhat unusual in that, unlike the major wars in Europe that could have led to a sense of national cohesiveness, it was essentially a civil guerrilla war marked by severe conflict between local militant groups. Somasundaram and Rajadurai (16) analysed the suicide and homicide rates for the period 1980-1989 and report that in 1987 there was a decline in homicide and an increase in the suicide rate during the months of peace (August – September) with a reverse trend following this at the beginning of major military action.

In Serbia, also during a period of civil war, Selakovic-Bursic (17) found a 50% decrease in the number of suicides in the most war-active year of 1999 compared with the previous year.

War is Associated with an Increase in Suicide Rates

In contrast to the above studies, others have reported distinct *increases* in suicide during wartime. Henderson et al (5), for example, examined suicide rates in Scotland before, during and after the Second World War. Whilst they found a decline in the overall suicide rate for both men and women for the period 1931-1952, they noted that when this was taken into account there was an increased likelihood of suicide in both sexes during the war years (Odds Ratio 1.085; 95% CI 1.037-1.137). This was particularly notable in men rather than women (OR 2.328; 2.225-2.434) and especially in men aged 15-34 years. In this age group suicide

rates increased significantly during the war years and then fell to pre-war levels by the late 1940s.

An increase in suicide was also reported by Loncar et al (18). These researchers analysed data on over 16,000 people with a mental disorder, before, during and following the war in Croatia (1991-1994) and found the incidence of suicide to be highest during the war years. Similar findings in the whole population rather than only those with a mental disorder, have been reported by Bosnar and associates (6) who also examined suicide in Croatia in the war years, and found the number of suicides as well as the suicide rate to have "increased drastically" in wartime. In the neighbouring countries of Serbia and Montenegro, Selakovic-Bursic et al (19) examined the civil war data from 1989-2003, where conflict extended from 1991-1994 and occurred once again in 1999. They too found an increase in acts of suicide in wartime, and observe that their findings conform to Durkheim's prediction that suicide rates will be expected to increase during unpopular, political, wars.

THE ACTIONS OF COVARIATES IN MEDIATING THE RELATIONSHIP BETWEEN WAR AND SUICIDE RATES

It is to be expected that in a time of war the level of civil strife will be enormous. Bombing raids, the deaths of friends, family and soldiers on active service as well as a continually raised level of psychological stress, will all take their toll on the civilian population and in some will lead to the act of suicide. Although a counter-argument can be made, that group cohesion may be increased by membership of a 'community of suffering' (20), there is at least an intuitive appreciation that wartime stress may be a potent source of suicidal acts in non-combatants. However, there has been a growing understanding that economic factors may play a much greater role in mediating the effects of war on suicide rates in the civilian population. In 1965 Henry and Short proposed a close association between business activity and suicide (21) and others have since provided evidence in support of this view. O'Malley (20), for example, notes that the level of business activity is inversely related to suicide rates and proposes that "…the wartime decline in suicides may be a product of causal chains which operate through the influence of economic, rather than through Durkheimian integrative processes" (p. 352). However, he concludes from an analysis of the suicide rates of women resident in Australia during World War II, that in fact it is not business factors but those of group integration that appear to account for the wartime reduction in suicidal behavior. And so the debate continues. There is considerable support for the role played by economic factors in wartime suicide rates (7,13) and it is recognised by many that, whilst other factors are important, an 'economic factor of well-being' is at least partly responsible for varying suicide rates at times of conflict (19).

Throughout this discussion it should be clear to the reader that the influence of Durkheim can hardly be over-estimated. Since the publication of *Le Suicide* a considerable body of evidence has been marshalled in support of his model of the influence of war on suicide. As this chapter has shown, this evidence has emanated from very different types of conflict in geographical regions and cultures as diverse as Sri Lanka (16), Serbia (19) and Australia (20). Nevertheless, a range of criticisms have been levelled at the work, especially that Durkheim effectively neglected data that were inconsistent with his theory. This is particularly evident

in his rejection of the role played in suicide by mental illness, which Robertson views as a fundamental flaw in the argument outlined in *Le Suicide* (22). An example of this is Durkheim's conclusion that suicides by people with mental illness are always impulsive and lacking in rational reflection. He also considered decreased social integration to be necessarily a consequence, rather than a cause, of psychiatric disorder. These interpretations are clearly open to debate and contemporary sociological opinion is in fact more likely to view mental illness, and depression in particular, as the single most important factor leading to suicidal behaviour (23). Furthermore, Durkheim's conceptualization of suicide itself and his interpretation of data have been criticized for being based on a biased understanding (24,25) relating to his flawed interpretation of the relative immunity of women to suicide and his exclusion of attempted suicide from his analysis (26).

These weaknesses in Durkheim's thought have led some to conclude that his typology of suicidal behaviour must be viewed with considerable scepticism (26). Nevertheless, suicidologists continue to report evidence in support of Durkheim (e.g. 27), which reflects the deep entrenchment of his ideas in our understanding of suicide. This is not to say support is absent from the more psychodynamic theories that stress the role played by war in turning aggression away from the self (suicide) towards a common enemy (homicide sanctioned by the state of war), but the evidence for this model is rather thin. In fact Marshall has indicated that his findings from an analysis of suicide trends in white American adults between 1933-1976 runs distinctly counter to the psychological hypotheses of Henry and Short (13).

GROUPS MOST VULNERABLE TO SUICIDE IN WARTIME

Research in this field has frequently identified groups that are particularly vulnerable to suicide in war, however, there is a confusing degree of variation in findings. For example, it has been found that during World War II Scottish suicide rates increased particularly for men aged 15-34 years, whereas age specific trends did not generally alter for women (5). Similar findings, at least in males under 40 years, have been reported in relation to the conflicts in Croatia (28) and Serbia (19) although other researchers in Croatia have found a *reduction* in suicide rates for males in the areas most directly affected by the war (15). Clearly further research is needed to clarify the dynamic underlying this confusing and complex picture. What, however, is less in doubt is the impact on the suicide rate of the sudden increase in the availability of firearms that accompanies war.

THE AVAILABILITY OF LETHAL MEANS IN WARTIME

One undisputed factor in determining the rate of suicide in a population is the availability of lethal means. In wartime there is clearly a rapid expansion in the availability of firearms and explosives and this in itself is known to be associated with higher rates of suicide (29, 30, 31). There is no doubt that firearms will become widely available to military personnel in times of war, but we should remember that their availability to the non-combatant population will also increase considerably (15). It seems likely that this will be at least partly a result of

the loosening of firearm controls in wartime, the significance of which is that stricter controls are known to reduce their use in suicide (32, 33).

Research has shown that the increased availability of firearms and explosives in war has frequently been associated with their increased use in suicide (for example, 5,6,34,35), although data here are confusing since the available official statistics rarely discriminate between combatant suicides and suicides in the civilian population. The availability of accurate data is fundamental to an accurate assessment of suicide in wartime; indeed, as outlined in the next section, a number of factors can be seen to present difficulties in researching wartime suicides.

DIFFICULTIES IN RESEARCHING SUICIDE IN WARTIME

Durkheim considered the possibility that the reduction in suicide he observed during wartime may have been an artefact of accounting. He dismissed this explanation, partly on the grounds that the decrease in suicide should continue only as long as administration procedures are acutely disrupted by the war situation. However, it is feasible that Durkheim considered only a limited number of ways by which the social upheavals of war could have affected official recording procedures (20) and the reliability of official data on suicide rates in wartime consequently remains a very contentious issue. One can appreciate that it will be especially problematic to gather accurate evidence and ascertain the facts around a civilian death at a time of war because of the disruption in everyday life. The machinery for identifying suicides will, for example, be disturbed and local medical and judicial services will already be stretched. Furthermore, it is possible to conceive of a number of situations where cultural attitudes to suicide could change in times of war. This may lead to officials being more favourably disposed to conclude that a death has been the result of some cause other than something as potentially morale-lowering as suicide. It is also possible that, because mortality from most causes rises in wartime, an individual who may otherwise have been a high risk for suicide will be more likely to die from other causes, a factor that applies to the civilian as well as the military population. Yet further obstacles are introduced through the role played by government propaganda, since under-reporting of suicide may be common practice. Officially collected data may also simply remain secret and so be unavailable for analysis by non-military or non-governmental researchers, as suggested by Selakovic-Bursic and colleagues (19). Nor are such practices restricted to former communist countries: O'Malley (20) draws our attention to the perception of threat in Australia during the Second World War. Here information about the war was selectively presented and interpreted by "…a series of gatekeeper institutions (whose interests favoured the presentation of war news in a manner which involved extensive censorship)…" (p. 350). More benign circumstances may also hinder and distort the accurate collection and interpretation of suicide data in wartime, such as differing recording procedures between countries and cultures. Suicide may be particularly vulnerable to this because it is so strongly governed by personal, legal, moral and cultural taboos in different societies, in association with their religious and legal sanctions (36). Variations between cultures in terms of the exposure of individuals to risk factors for suicide, is what Neeleman has called *contextual effect modification* (37). The principle is that a range of factors specific to a study group, such as the prevalence of risk or protective factors

for suicide in their social context, will influence group members' suicide risk in interaction with their personal risk factors. As well as this there is some debate whether the different contexts of wars over the ages render them, and phenomena specific to them such as suicide rate, incapable of meaningful comparison. In the present chapter several comparisons have been made between suicide during great national wars such as the Second World War, and civil wars like that in Sri Lanka, but this is problematic even within the same war context. As Marshall comments, the social psychology of a great national war in the USA may differ significantly from that of a great national war in Italy or Germany (13). For now this issue remains unresolved but should be borne in mind when we attempt to interpret data on wartime suicide rates.

Establishing the 'true picture' of suicide in wartime civilian populations is compromised finally by factors inherent to the process of research. The research literature suffers from a distinct lack of clarity around the focus of many studies, for example, whether the focus is all suicides in a given population or suicides in only the civilian or military population. Further difficulties are posed by the analysis of specific conflicts into pre-war, wartime and post-war phases. As Marshall has noted (13), the use of a binary variable (war/not war) in analysis may fail to adequately represent war since it makes no allowance for the succession of crisis states that may exist between war and peace.

CONCLUSION

In this chapter many of the limitations and weaknesses of our current state of knowledge have been discussed. It is clear that a considerable number of challenges face future research in this area and many questions remain unanswered. What is the role of employment in mediating the relationship between war and suicide? What is the relevance of theoretical models of suicide? In what ways do the social and psychological models of suicide interact? Ultimately, however, perhaps the most important question we should be asking is how we may best minimise the tragic impact of war on those people who are most susceptible to the risk of suicide.

REFERENCES

[1] Krug EG, Kresnow M, Peddicord JP, Dahlberg LL, Powell KE, Crosby AE, Annest JL: Suicide after natural disasters. *New England Journal of Medicine* 1988; 338:373-378.

[2] Shioiri T, Nishimura A, Nushida H, Tatsuno Y, Tang SW: The Kobe earthquake and reduced suicide rate in Japanese males. *Archives of General Psychiatry* 1999; 56(3):399-401.

[3] Lester D: The effect of war on suicide rates. *European Archives of Psychiatry and Clinical Neuroscience* 1993;242:248-249.

[4] Snowdon J, Hunt GE: Age, period and cohort effects on suicide rates in Australia, 1919-1999. *Acta Psychiatrica Scandinavica* 2008;105(4):265-270.

[5] Henderson R, Stark C, Humphry RW, Selvaraj S: Changes in Scottish suicide rates during the Second World War. *BMC Public Health* 2006;6:167.

[6] Bosnar A, Stemberga V, Coklo M, Zamolo Koncar G, Definis-Gojanovic M, Sendula-Jengic V, Katic P: Suicide and the war in Croatia. *Forensic Science International* 2004;147S:S13-S16.
[7] Stack S: Suicide: A 15 year review of the sociological literature. S*uicide and Life-threatening Behavior* 2000; 30:163-176.
[8] Durkheim E: *Le Suicide*. 1897; Paris: Felix Alcan.
[9] Durkheim E: *Suicide: A sociological study.* (Translated by Simpson G and Spaulding J). 1960; New York, Free Press.
[10] Henry A and Short J: Suicide and homicide. 1954; New York: Free Press.
[11] Platt S: Unemployment and suicidal behaviour: a review of the literature. *Social Science Medicine* 1984;19(2):93-115.
[12] Rehkopf DH, Buka SL: The association between suicide and the socio-economic characteristics of geographical areas: A systematic review. *Psychological Medicine* 2006; 36(2):145-157.
[13] Marshall JR: Political integration and the effect of war on suicide: United States, 1933-76; *Social Forces* 1981;59(3):771-785.
[14] Lester D: Suicide rates before, during and after the world wars. *European Psychiatry* 1994; 9:262-264.
[15] Grubisić-Ilić M, Kozarić-Kovacić D, Grubisić F, Kovacić Z: Epidemiological study of suicide in the Republic of Croatia – comparison of war and post-war periods and areas directly and indirectly affected by war. *European Psychiatry* 2002;17(5):259-64.
[16] Somasundaram DJ, Rajadurai S: War and suicide in northern Sri Lanka. *Acta Psychiatrica Scandinavica* 1995;91:1-4.
[17] Selakovic-Bursic S: *Suicidal behavior during NATO bombing of Yugoslavia.* Revista Internacional de Tanatologia Y Suicidio 2001; 4:40-44.
[18] Loncar C, Definis-Gojanović M, Dodig G, Jakovljević M, Franić T, Marcinko D, Mihanović M: War, mental disorder and suicide. *Collegium Antropologicum* 2004;28(1):377-384.
[19] Selakovic-Bursic S, Haramic E, Leenaars AA: The Balkan Piedmont: Male suicide rates pre-war, wartime, and post-war in Serbia and Montenegro. *Archives of Suicide Research* 2006;10:225-238.
[20] O'Malley P: Suicide and war. *British Journal of Criminology* 1975;15(4):348-359.
[21] Henry AF and Short JF Jnr: *Suicide and Homicide*. 1965; New York, Free Press.
[22] Robertson M: Books reconsidered: Emile Durkheim, *Le Suicide. Australasian Psychiatry* 2006;14(4):365-368.
[23] Goldney RD: Depression and suicidal behaviour: The real estate analogy. Crisis: *Journal of Crisis Intervention and Suicide* 2003;24:87-88.
[24] Kushner HI: Suicide, gender and the fear of modernity in nineteenth-century medical and social thought. *Journal of Social History* 1993;26:461-490.
[25] Kushner HI: *Durkheim and the immunity of women to suicide*. In, The Centennial of Durkheim's Le Suicide. Edited by Lester D. Philadelphia, Pa, The Charles Press, 1994, pp 205-223.
[26] Kushner HI, Sterk CE: The limits of social capital: Durkheim, suicide and social cohesion. *American Journal of Public Health* 2005;95(7):1139-1143.

[27] Fernquist RM: How do Durkheimian variables impact variation in national suicide rates when proxies for depression and alcoholism are controlled? *Archives of Suicide Research* 2007; 11:361-374.

[28] Bosnar A, Stemberg V, Zamolo G, Stifter S: Increased suicide rate before and during the war in southwestern Croatia. Archives of Medical Research 2002;33(3):301-304.

[29] Armour A: A study of gunshot suicides in Northern Ireland from 1989 to 1993. *Science and Justice* 1996; 36:21-25.

[30] Hawton K, Fagg J, Simkin S, Harriss L, Malmberg A: Methods used for suicides by farmers in England and Wales. The contribution of availability and its relevance to prevention. *British Journal of Psychiatry* 1998; 173:320-324.

[31] Booth N, Briscoe M, Powell R: Suicide in the farming community: Methods used and contact with health services. *Occupational and Environmental Medicine* 2000; 57:642-644.

[32] Rich CL, Young JG, Fowler RC, Wagner J, Black NA: Guns and suicide: Possible effects of some specific legislation. *American Journal of Psychiatry* 1990; 147: 342-346.

[33] Solan JH, Rivara FP, Reay DT, Ferris JAJ, Path MRC, Kellermann AL: Firearms regulations and rates of suicide: A comparison of two metropolitan areas. New England Journal of Medicine 1990; 332: 369-373.

[34] Vranković D, Splavski B, Hećimović I, Glavina K, Mursić B, Blagus G, Dmitrović B: Self-inflicted gunshot wounds to the head during the war and post-war period. *Injury* 1998;29(5):369-73.

[35] Bosnar A, Stemberga V, Cocklo M, Grgurevic E, Zamolo G, Cucic T, di Nunno N: War and suicidal deaths by explosives in Southwestern Croatia. *Archives of Medical Research* 2006;37:392-394.

[36] Wasserman D, Varnik A: Reliability of statistics on violent death and suicide in the former USSR. 1970-1990. *Acta Psychiatrica Scandinavica* 1998; Suppl. 394:34-41.

[37] Neeleman J: Beyond risk theory: Suicidal behaviour in its social and epidemiological context. *Crisis* 2002;23(3):114-120.

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 7

THE NETHERLANDS AND WORLD WAR II, JEWS AND SUICIDE

Wout Ultee, Ruud Luijkx and Frank van Tubergen
Radboud University Nijmegen, Nijmegen, The Netherlands;
Tilburg University, Tilburg, The Netherlands;
Utrecht University, Utrecht, The Netherlands

ABSTRACT

World War II in the Netherlands lasted from May 1940 to May 1945**.** Suicide numbers peaked in these months, in the first case because of suicide by Jews, and in the second case because of suicide by collaborators with the German occupier. Suicide rates for Jews were higher in 1942 than in 1940 and even higher in 1943 than in 1942. Foreign Jews were more likely to die of suicide than Dutch Jews, and Jewish women more than Jewish men. Suicide of non-Jews was lower in the intermittent war years than in the years before and after World War II.

INTRODUCTION

The archive of Statistics Netherlands stores all forms completed by judicial authorities for death by suicide in the Netherlands between 1936 and 1952, as well as all coding cards Statistics Netherlands created with these forms. We compiled from these documents several tables (1,2). Here we explain the regularities they display with Durkheim's theory of suicide (3). Although this theory, designed by a proponent of autonomous sociology, is a century old, and despite pleas for a synthesis of psychiatry, psychology and sociology, it still is attractive. Like no other theory, it explains a host of statistical regularities, and it does so with several layers of hypotheses invoking more and more features of the society to which persons belong.

The prime regularity perspiring from the Dutch data is that, while Jews before World War II had an above average suicide rate, their suicide rate during World War II was much higher. Jews committed relatively more suicides than other persons in the middle of May

1940, when the Netherlands surrendered to Germany. The Jewish suicide rate for 1942, when the German occupier first ordered Jews to depart for camps, was higher than that for 1940, and the rate for 1943, when deportations were completed, climbed even higher. In addition, the war years saw a decline in the extent to which suicide of foreign Jews surpassed suicide of Dutch Jews. Moreover, in contrast to findings for times of peace, the suicide rate of Jewish women overtook that of Jewish men, and the rate of Jewish widows that of Jewish widowers.

These findings may be accounted for by a novel application of Durkheim's well-known thesis that suicide varies inversely with integration. It holds that during World War II the German occupier segregated the Jewish inhabitants of the Netherlands from the rest of society, at first as far as leisure goes, later also with respect to work, and then additionally in regards housing, which made suicide rates soar. But perhaps more persuasively they are to be explained by Durkheim's relatively neglected thesis on fatalist suicide: Jews were placed outside society, and feared that the German occupier would withhold them the right to live.

THE FOUR LAYERS IN DURKHEIM'S THEORY OF SUICIDE

Durkheim distinguished four types of suicide: egoist, altruist, anomic and fatalist suicide. Since propositions of ever wider scope are more worthwhile than a row of pigeon holes, we now highlight the hypotheses behind Durkheim's types. Our names for them closely resemble Durkheim's phrasing: the limited-integration hypothesis, the norm-of-approval hypothesis, the weak-regulation hypothesis and the too-many-norms hypothesis.

The first layer of Durkheim's theory of suicide posits that a society consists of groups like families and congregations, and that the members of contemporary societies are subjects of a super-group called state. If a person has stronger ties with a society's groups, that person's chances of suicide will be lower, whereas weaker ties make for higher chances. With this limited-integration hypothesis Durkheim explained several statistical regularities for 19th century European countries, like the higher suicide rate of single compared with married persons, and the higher chances of Protestants relative to Catholics (with Protestant churches having less ministers than Catholic churches priests). The limited-integration hypothesis was strongly corroborated by recent Norwegian data showing that the more children a woman has borne at a certain point in time, the less likely she is to die later of suicide (4).

The second layer of Durkheim's theory notes that the groups to which persons belong almost always disapprove of suicide. However, it highlights the few groups that under specific circumstances condone or even demand suicide. Integration in a group with such a norm would increase suicide chances. Durkheim postulated the prevalence of a permissive norm in the armies of 19th century Europe, and explained in this way the higher suicide rate of the military compared with the civilian population, the higher rate of officers relative to the chances of non-commissioned officers, as well as the higher chances of the latter in comparison to those for soldiers. A 20th century corroboration of the norm-of-approval hypothesis form the Japanese Kamikaze pilots during World War II (5).

Durkheim's theory has a third layer too. It expands the assumption that societies have norms about suicide. People pursue aims and employ to that effect resources, and societies have norms with respect to these ends and means. Since by nature the desires of human beings are unlimited, societies develop standards making the striving for certain goals and the

use of certain means illegitimate. In most cases, societies attune in this way the aspirations and abilities of all persons to each other, and therefore the ambitions and assets of each individual.

However, according to Durkheim the norms of societies sometimes do not lead to a steady balance. The more the legitimate goals of persons surpass their legitimate means, the higher their chances to commit suicide. As Durkheim insists, societies with free markets for material goods have done away with laws that harmonize the material goals and capacities of their members. Their injunctions foster the pursuit of happiness, and allow any means, as long as it is a peaceful one. These conditions would foster suicide. With the weak-economic-regulation hypothesis Durkheim explains that in European countries in the 19th century stock-exchange crashes are accompanied by higher suicide rates. Suicide rates are higher too in times of big booms, when the goals of some persons rise much more than their resources.

Following Durkheim, the institution of marriage balances the affectionate aspirations of a society's inhabitants, with the legal option of divorce disjointing them for men (yet less for women), making for more suicide. The weak-conjugal-regulation hypothesis explains the statistical regularity that divorced males have a higher suicide rate than single males. This hypothesis also explains the finding that married males in societies where divorce is more common, stand higher chances of suicide than in societies where divorce occurs less often.

The fourth and final layer of Durkheim's theory is the least developed one. Apart from the situation in which the goals and means of a society's members are harmonized by a society's norms, and the less frequent condition under which a person's legitimate goals surpass this person's legitimate means, there are even more exceptional circumstances in which the rules of a society are so strict, that the low aims a society allows some of its members to pursue, fall far below their abilities and opportunities. Durkheim adduces data bearing on the too-many-norms hypothesis. France at the end of the 19th century displays a high suicide rate for men who are very young as well as married, and a high one too for married women without children. Durkheim also invokes the frequent suicide of slaves in the French colonies before the abolition of slavery. Being interested primarily in future societal developments, Durkheim does not augment the latter finding of supposedly historical interest only. However, we will argue that the too-many-norms hypothesis goes a long way towards explaining high Jewish suicide rates in the Netherlands during World War II.

HALBWACHS ON SUICIDE

Reviewing the few available figures, Durkheim held that within one and the same country, Jewish suicide was lower than Catholic suicide, with Jewish suicide rising. Durkheim's pupil Halbwachs found that in several German states Jews had overtaken Protestants (6). Whereas Durkheim said not to know why Jewish rates were rising, Halbwachs suggested that Jewish rates were higher because Jews mainly live in towns. Catholics would have a lower suicide rate than Protestants, since they are more likely to live in rural areas. However, this suggestion does not square with a finding that Halbwachs adduces for Amsterdam: in 1905-1914 the capital of the Netherlands witnessed 5.1 Catholic suicides per 100,000 Catholics, with the figures being 8.2 for Protestants and 9.7 for Israelites. In addition, Halbwachs does not incorporate findings about suicide in rural and

urban areas into Durkheim's theory: if the locality where people live forms a more closely knit group, suicide is lower.

Halbwachs finds that whereas the countryside once had lower suicide rates than cities, urban areas later had lower rates. Although Halbwachs reiterates this finding, it is not much of a puzzle for Durkheim's limited-integration hypothesis. Farmers as a group were strong, but withered away in the wake of industrialization. Also, the people who moved to a city first lived there without extended families and next to people from different rural areas. But later they acquainted their neighbours and founded households. Rural areas at the onset of industrialization were more integrated than urban ones, but later on the latter became so.

According to Durkheim, a country's suicide rate is lower in times of war. His limited-integration hypothesis explains this finding: under the condition of war, a society's members are more strongly tied to each other than in times of peace. Halbwachs pointed out that for France, Germany, Italy and the United States the general suicide rate dropped for 1914-1918, during the Great War, later called World War I. It dropped in those years too in England and Wales for women and for older men, which is to say that Durkheim's thesis was corroborated with figures undistorted by supposedly bad bookkeeping in the army during wars.

Halbwachs also showed that the suicide rates for 1914-1918 were lower for Denmark, Norway, Sweden, and Switzerland, countries that stayed outside World War I. In addition, Halbwachs held that this statistical regularity speaks against Durkheim's limited-integration hypothesis. Here we beg to differ. In countries with a risk of becoming involved in World War I, cohesion may rise too. The fear of getting caught up in World War I definitively was there in Denmark. Danes were holding their breath during the naval battles between Britain and Germany in the North Sea off the coast of Jutland, the mainland of their territory. Of course, Halbwachs' explanation that life simplifies in times of war, making for less suicide, might still hold. But that would be a hypothesis unrelated to Durkheim's theory, just like the finding that the effect of locality on suicide reversed. So, Halbwachs does not offer an explanation which is as tightly knit as Durkheim's explanation.

SUICIDE STATISTICS FOR THE NETHERLANDS

Neither Durkheim nor Halbwachs presented suicide figures for the whole of the Netherlands. Only a few figures were around when Durkheim published, but three important ones when Halbwachs did so. Figures for the Netherlands until recently stemmed from two sources: the certificates indicating the cause of death handed in by physicians before the municipal authorities allowed the burial of a dead body, and the forms completed by judicial authorities for various types of violent death, which Statistics Netherlands turned into coding cards. The numbers we present are compiled from these long judicial forms and short form coding cards.

Verrijn Stuart, the first director of Statistics Netherlands (In Dutch: Centraal Bureau voor de Statistiek), reported that, according to figures on death causes for 1909-1910, the number of suicides per 100,000 Catholics was 7.6. The rate for Protestants was 17.1, and for Jews 28.3 (7). These figures buttress Durkheim's regularity about confession and suicide.

A second finding concerns suicide in the Netherlands during World War I. The Netherlands remained neutral during these hostilities. However, its government and its

population feared that the Netherlands, like neighbouring Belgium, might be overrun for strategic purposes by German troops. They also were afraid that Britain might declare ware against the Netherlands, since Germany traded through Dutch harbours, of which Britain disapproved. The time series for the absolute number of judicially ascertained suicides in the Netherlands dropped from 505 in 1912 and 531 in 1913, to 478 in 1914, 466 in 1915, 448 in 1916 and 450 in 1917, to rise to 575 in 1918 and 598 in 1919 (List of primary sources: Statistics Netherlands, Zeventig jaren statistiek in tijdreeksen 1899-1969). These figures fortify a regularity ascertained by Halbwachs. It also squares with a Durkheimian explanation, since the fear of a war being declared by Germany or Britain was widespread. So, it is not only actually being involved in a war that makes for stronger ties and less suicide between a country's inhabitants, the fear of becoming involved in a war does so too.

The third finding comprises figures for 1905-1910 published by Statistics Netherlands. It is a mammoth table pertaining to all deaths in those years, cross classifying death causes, including as one category suicide, conjointly after gender, age and religion. For some reason or other, it remained unanalyzed for a century. We will return to this table in the next section.

The long and short forms for suicides are quite informative. They give the exact birth date of persons, their gender, marital status, schooling, occupation, way of committing suicide, motive to do so, municipality of residence, the date and place of the act, and whether the person who committed suicide did so on his own or with another person or other persons. Religious denomination had been there from the 1936 to the 1981. It distinguishes, as is common in the Netherlands, between Dutch-Reformed Protestant, Re-Reformed Protestant, Roman-Catholic, Israelite, other denomination, and no denomination. The name 'Israelite' invokes the official designation of the synagogue organizations of the Netherlands. The long form allows for write-ins, and to test some of our hypotheses we will code them.

THE ACCURACY OF DUTCH SUICIDE STATISTICS

As to the accuracy of Dutch suicide statistics, Verrijn Stuart reported that in the first years after 1900, numbers from judicial authorities were one third higher than those from reports on death causes (7). As a comparison of publications by Statistics Netherlands on the years just before World War II shows, at the end of the 1930s they were one tenth higher.

In 2005 three Dutch sociologists used the 1905-1910 table giving death causes, one of them being suicide, for all combinations of gender, age and religion (8). They did so to shed light on the argument advanced by Halbwachs that Catholics are as likely to commit suicide as Protestants. Catholics just would hide suicide more often as a death cause. To develop this ad hoc explanation into an independently testable one, the three authors assumed that Catholic suicides were moved to one of four other categories of death causes: real accidents, suspected accidents, sudden deaths and ill-defined or unspecified causes, and that Protestant numbers for suicide and these other death causes were untainted. Their calculations showed that the observed Catholic suicide numbers, for the various combinations of age and gender, were still too low after adding misplaced suicides. So, the tabulations for suicide as a death cause were at least so accurate that figures which show Catholics to have a lower suicide rate than Protestants, could not be discounted by underreporting for Catholics.

The question of the accuracy of Dutch suicide statistics for 1940-1945, that is, during World War II, cannot be answered with a straight yes or no. After the surrender of the Netherlands, the German occupier did keep statistics secret that formerly were published. However, monthly and yearly numbers of deaths after cause, including suicide, kept on being published. Even the figures for the larger municipalities were published fully. Amsterdam, the largest town of the Netherlands and the one with the highest percent of Jewish inhabitants, reported 32 suicides for April 1940, 151 for May, and 10 for June that year (List of primary sources: Maandschrift van het Centraal Bureau voor de Statistiek 1940). The yearly numbers for suicides in 1940, and not those in 1939, were given an asterisk. It declared that deaths of under-aged children found next to parents who died of suicide, were counted as suicides too.

However, during the war years Statistics Netherlands did not publish the breakdown of judicially ascertained suicides after religion, whereas it did so for 1937, 1938 and 1939, and again for 1950 onwards. Tellingly, one table for 1940 carries the heading 'Distribution of suicides after the provinces and the large municipalities', without actually containing numbers for municipalities. Of course, the table with this heading for 1939 did give them (List of primary sources: Statistics Netherlands: Crimineele Statistiek over het jaar 1939 en 1940). Statistics Netherlands kept all figures on file, and archived each form for suicide made up by the judicial authorities, as well as every coding card it derived from it (List of primary sources: Statistics Netherlands: Centraal Archief). The yearly absolute number for all suicides and all Israelite suicides in the Netherlands from 1937 to 1943, were published in 1948 with English comments by Speyer, who practiced as a psychiatrist before World War II and until January 1943 in *Het Apeldoornsche Bosch*, the prime Jewish mental hospital in Holland (9).

As it turns out, there are discrepancies in the yearly number of suicides yielded by the judicial forms and the coding cards. Although the coding cards clearly stem from the judicial forms, there is no exact match between them. When perusing archive boxes, we found forms without cards, and cards without forms. This may have to do with incomplete preservation, but more is going on. To begin with, in the years before World War II, the judicial authorities filled in forms for suicides committed in the Netherlands by persons who were not residing in the Netherlands. It seems that for these forms, coding cards are lacking. Then, the judicial authorities and Statistics Netherlands have been at loss about what to do with children who were found dead with their parents, who obviously had committed suicide. Sometimes these authorities did not fill in forms for these children, while Statistics Netherlands added coding cards for them. Finally, at the end of World War II, Statistics Netherlands, although it did not avail of particular judicial forms, seems to have made coding cards for suicides according to declarations on death causes handed in by physicians. This may have been done to fill gaps because of faltering administration. We did not sort out these irregularities, but hope our remarks explain why in the tables to be presented, numbers do not always fully agree.

For later war years, the information on forms and cards was patchy. An example is the confession of persons. Whereas this information was missing for less than five percent of all cases of suicide before and after World War II, as well as for 1940-1943, it was around 35 in 1944-1946. In some municipalities resistance groups had set fire to the register of inhabitants. In addition, so many houses were destroyed and so many people lived elsewhere, that municipal registers were in disarray. This made it more difficult for judicial authorities, even if they were still operating at full capacity, to fill out suicide forms. Finally, the liberation in September 1944 of the part of the Netherlands below the big rivers, thwarted Statistics Netherlands, which had its offices in the part still under German occupation.

As to the comparison of actual and reported numbers of suicides for the years of World War II, we distinguish two possibilities. The first is that the numbers of suicides on file amount to an undercount. That may be the case, but the figures we will show for Jewish suicides are extremely high to begin with. Nor do the remarks on these forms indicate censorship by the German occupier. A write-in like 'Jewish persecution' speaks against this, and the forms several times give, as the place where a person committed suicide, the number of the barrack of *Camp Westerbork* in the Netherlands, from which the German occupier transported Jews to Auschwitz, Bergen-Belsen, Sobibor and Theresienstadt.

Then there is the possibility that the numbers of suicides on file are an overcount. For instance, the German occupier may have shot members of the resistance, with these murders being classified as suicides. However, as will become clear, we found particularly low numbers of suicides by non-Jewish persons during the war years. In addition, it might be ventured that the German occupier shot Jews when fetching them from their homes, with these murders being classified as suicides. However, diaries kept by Non-Jews during World War II do not indicate this, nor has any such story surfaced later. Finally, persons who had collaborated with the German occupier and were arrested for this upon the Allied liberation of the Netherlands, may have been booked as suicides, while they died of dangerous activities they were forced to perform by their guards. The widow of one prominent member of the Dutch National Socialist Movement has maintained so in public for many years about the death of her husband. There is ample evidence that guards treated prisoners cruelly (10). We surmised that in case of a murder classified as suicide, the way of committing suicide, would have remained blank on the forms to be completed. However, we found that for all persons suspected of a political crime, forms mentioned how they committed suicide.

We performed two checks on Jewish suicides. The story of the Jews in the various municipalities of the Netherlands during World War II, has been told by local historians. Books on the smaller municipalities of Gorcum, Leeuwarden, Meppel and Wassenaar cite 25 Jewish suicides from May 1940 until the end of 1943. These cases were compared with the judicial forms in the archive of Statistics Netherlands. This is quite easy, as the name of the municipality where a suicide was committed, together with the exact date of a suicide and the date of birth of a person, allow for matching. For these dates and cities we found 17 judicial forms. Of these 17 Jewish persons, 15 were mentioned in the local histories, and two not. Of the ten mentioned in the local histories, but seemingly not on the judicial forms, two referred to suicides committed in these cities by persons having their domicile elsewhere in the Netherlands. They were retrieved as forms for these cities. Two other suicides referred to persons the judicial authorities classified as being without a religion, but had been given a write-in that they were of Jewish descent. Finally, four cases were under-aged children of Jewish adults who had committed suicide. The judicial authorities made no form for them, but Statistics Netherlands added coding cards for these children. This check attests to accuracy.

So did a check against the lists of persons who died of suicide made by the Jewish Council of Amsterdam, which by then performed duties for the German occupier for the whole of the Netherlands. These lists were requested in July 1942, when the first Jews were summoned to depart for Camp Westerbork. An uninterrupted series of reports stretches from September 1942 to May 1943. The reports are preserved and mention 178 persons (List of primary sources: Netherlands Institute of War Documentation. Inventaris 182-36b). For this period Statistics Netherlands counted 252 Israelite suicides. Here matching was impossible,

since the lists only gave full names and ages (in years), whereas the forms do not contain names.

We finish this section by noting that suicides committed by Dutch persons outside the Netherlands, for instance Jews who threw themselves into the barbed wire of Auschwitz-Birkenau, are not included in Dutch suicide statistics. Hermann Langbein, who as a prisoner in this camp each morning was assigned to collect dead bodies, declared at the Auschwitz trial that these suicides were particularly frequent after the arrival of trains from the Netherlands (11).

AN ULTRA-BRIEF HISTORY OF THE NETHERLANDS AND ITS JEWISH POPULATION

The borders of the contemporary Netherlands, as well as those of this state in 1940 and 1945, are almost the same as those of 1648. In that year the 1568 revolt of the Protestants in the Low Countries against Catholic Spain ended in independence for its northern provinces, with political privileges for members of what later was called the Dutch-Reformed Church. The southern provinces, presently called Belgium, remained under Spanish rule. In 1815 the Vienna Congress rejoined all provinces. After a revolt in 1830, which started in the opera in Brussels, now the Belgian capital, the northern and southern provinces were separated again.

The part of the Netherlands above the big rivers was largely Protestant, and that below them almost fully Catholic, as well as pockets above them. In the 20th century Holland, of course, consisted of higher and lower strata. However, a distinguishing feature were its religious pillars cutting through economic strata (12). Catholics married Catholics, Re-Reformed (orthodox) Protestants married Re-Reformed Protestants, Dutch-Reformed (liberal) Protestants married Dutch-Reformed Protestants, persons without a denomination persons without a denomination, and, more strongly than the other confessions, Israelites married Israelites (13). A person of a particular denomination voted for a party professing that faith in its program, and belonged to a labour union with the word Catholic, Christian (meaning Protestant) or Socialist in its name. Catholics and Protestants had their own state-funded schools, as well as soccer clubs and other leisure organisations. As intimated, denominations had their own hospitals too.

In the early 17th century Jews arrived in the Netherlands from Portugal. Portugal lately had come under Spanish rule. Spain had banished Jews a century earlier, and now drove them from Portugal. The Netherlands were at war with Spain, and took up refugees. From the middle of the 17th century on, 'Portuguese Jews' were joined by Yiddish speaking 'German Jews'. Both groups primarily settled in Amsterdam. They had their own synagogue, where some rites were performed in their own language and other rites in Hebrew. In the aftermath of the French Revolution, in 1795 Catholics as well as Jews acquired rights on an equal footing to Dutch-Reformed Protestants, who until then were politically privileged.

After guarding assiduously its neutrality, the Netherlands were attacked by Germany on the May 10, 1940. To deprive incoming German troops of Dutch facilities, on May 13 British Royal Engineers laid charges to harbour installations in IJmuiden, the outport of Amsterdam. The immanent demolitions apparently prompted Dutch authorities to close the quays of this harbour for incoming refugees, which resulted in few ships departing for Britain with Jews

from Amsterdam on board (14). On May 14, Germany bombed the centre of Rotterdam, the biggest Dutch harbour town. The Dutch Queen and her ministers having left for London, Great Britain, the Netherlands surrendered the same day.

Within a few months, Jews in the Netherlands began to loose their rights. The German occupier dismissed Jewish civil servants in November 1940. From January 12, 1941 on, the Dutch Cinema Association banned Jews from attending any of its movie theatres. On February 11, 1941 Dutch National Socialists marched on the 17th century Portuguese Synagogue in Amsterdam with the aim to damage it, being met by Jews and sympathizing Gentiles. This led to the involuntary foundation of the Jewish Council of Amsterdam. From March 1941 on Jewish businesses were being liquidated or transferred to Non-Jewish owners. In August 1941 Jews were ordered to transfer all accounts worth more than 1,000 guilders to a bank in Amsterdam bearing a name resembling that of a former Jewish bank taken over by the German occupier. Schools were closed for Jewish children in the beginning on the new school year, which is to say September 1, 1941. On September 15, 1941 Jews were barred from cafés, museums, parks, theatres and other public places. In March 1942 Jews were forbidden to marry Gentiles, in April they were required to wear a yellow badge in the shape of a star, and in June their shopping was restricted. Moore gives a more detailed chronology (14).

In July 1942 the German authorities summoned the first Jews to Camp Westerbork, as they said for a medical examination before departure to Germany for work under police surveillance. When not enough persons showed up in Amsterdam, the German authorities rounded up people on the streets. They could pick out Jews because of the pertinent stamp on the identity papers all people were required to carry with them after the German occupation of the Netherlands. Later on Jews were fetched from their homes. Depending on the municipality and the time, the German police arrested Jews, or the German police did so assisted by Dutch police, or the Dutch police on its own. The deportation of all Jews from all Dutch municipalities except Amsterdam to camps in the Netherlands was completed in April 1943. The final round-up of Amsterdam Jews took place on September 29, 1943 (14).

After May 15, 1940, most Dutch persons assumed that the Netherlands lost the war and that war was over. The idea that the Netherlands would be liberated by Allied Forces surfaced in mid-1942. A party akin to the German National-Socialists had obtained four percent of the vote in the 1937 elections for Dutch Parliament. With 52,000 persons, its pre-war membership was at its height in 1936. The 32,000 membership of May 1940 climbed to 86,000 in October 1941, to drop to 78,000 in March 1943. The last available figure, 76,000, is for September 1943. We estimate that all in all, at one time or other, about 150,000 Dutch persons belonged to the National Socialist Movement (15).

Organized resistance against the German occupier took off in May 1943, when the first Gentile youths were called up for jobs in the German war industry. Although they were allowed to return home for visits, few departed. Illegal newspapers, or rather irregularly appearing stencils, were being distributed in larger numbers from then on too, although they had been around from the summer of 1940. They reported spottily on the deportation of Dutch Jews, and next to nothing on the ongoing destruction of European Jewry. The same goes for Radio Oranje, the mouthpiece of the Dutch government in exile in London. This station was difficult to receive in the Netherlands. The German occupier had required people to hand in their equipment, and it jammed broadcasts. At the end of the war resistance groups

were active in every Dutch town, forging identity papers, stealing food stamps, providing food for people in hiding, blowing up bridges and railroads, and killing German dignitaries.

The part of the Netherlands below the big rivers was liberated by the Allied Forces in September 1944, and the rest of the Netherlands in April and May 1945. In the last war year, the western part of the Netherlands went through a 'hunger winter', taking some 20,000 lives. When Germany surrendered, the resistance began to seize Dutch persons for collaboration with the enemy. In the autumn of 1945 some 100,000 persons were in jail. After some years, about 65,000 persons had been sentenced (10).

The Dutch census traditionally asked after the religion of persons, and the 1930 census counted 111,917 persons of Israelite confession, or 1.4 % of the Dutch population, of which 65,558 living in Amsterdam (8.5 % of the population of that city). The 1940 census was cancelled. However, the German occupier ordered in January 1941 that persons with at least one Israelite grandparent should register themselves with the mayor of the municipality where they lived. Punishment for non-compliance was at the most five years in prison. All in all, 140,001 persons were marked as 'full Jews' (in German: Volljuden), that is, persons with three or more Israelite grandparents, or two and her- or himself of Israelite confession or married to such a person. In addition, the municipalities registered 14,895 persons with two Israelite grandparents while not of Israelite confession or married to such a person, and 5,990 persons with one Israelite grandparent. So, the Nuremberg Laws in force in Germany since September 1935 were applied in the Netherlands.

A publication on the January 1941 registration breaks down these three numbers after municipality, gender, age, marital status and nationality, as well as combinations of these characteristics. Most tables relate four characteristics to each other (List of primary sources: Rijksinspectie van de Bevolkingsregisters 1942). Amsterdam registered 79,479 'fully Jewish' persons, amounting to 9.9% of its inhabitants. In addition, of the 140,001 'full Jews' 117,999 persons possessed Dutch nationality. Also, according to the pre-war Dutch census definition of confession, for January 1941 the count for Israelites was 125,515 persons. Most of the other 'full Jews' did not belong to a denomination (to be exact 12,571 persons).

The German occupier sought to deport all 'full Jews', except about 12,000 persons married to a Gentile. We say 'about', as the pertinent instruction for registration was confusing. Until the end of September 1942, The German occupier had deported some 20,600 Jewish persons to camps outside the Netherlands, almost all from camp Westerbork.. In the final quarter of that year trains carried off 19,700 Jewish persons, in the fist quarter of the following year 13,600 Jewish persons, the second 22,300 Jewish persons, the third of that year 11,900 Jewish persons, and the last quarter 3,200 Jewish persons. The German occupier deported 7,900 Jewish persons from Westerbork in the first three months of 1944, 1,800 in the second, and 3,800 Jewish persons in the third quarter of 1944. It is estimated that 2,000 Dutch Jews, who fled the Netherlands and got caught, were deported from Belgium and France (16).

All in all, some 107,000 Jews were deported from the Netherlands to concentration or extermination camps outside the Netherlands. Of these persons around 5,000 survived. So, 73% of all Jews in the Netherlands were murdered. This made the Netherlands the West-European country with the highest percentage of Jewish deadly victims of the German occupation (17). These figures imply that 20,000 Jews survived in hiding. The number of Jews that went into hiding was higher, since it is known of Jewish persons who went

underground, that they were betrayed or otherwise found out. Their number has been estimated at 8,000 (14).

On May 5, 1945 the German troops in the Netherlands surrendered. May 5 became a day of celebration, and the evening of May 4, the time to remember the 230,000 war deaths, including more than 100,000 Jews.

SUICIDE ON THE NETHERLANDS BEFORE, DURING AND AFTER WORLD WAR II

We now present tables on file at Statistics Netherlands and tables compiled from the forms and coding cards for suicide in its archive. Our comments seek to explain figures with Durkheim's wide-scoped theory, at first with his limited-integration hypothesis, but later on suggesting that his too-many-norms hypothesis might be more applicable. Sometimes we present only absolute numbers, and at other times also rates per 100,000. We skip matters of statistical significance, since we are concerned with population figures. Finally, although it is possible to cross-classify suicide numbers after several characteristics of the persons who committed suicide, such a multivariate analysis is not in order, because comparable figures are lacking for persons who did not commit suicide.

Table 1. Absolute numbers of suicides, Netherlands 1936-1949

1936	762	1943	837
1937	745	1944	662
1938	823	1945	1024
1939	737	1946	852
1940	1038	1947	701
1941	647	1948	697
1942	879	1949	674

Source: Time series on file at Statistics Netherlands.

Table 1 presents the absolute number of all suicides in the Netherlands from 1936 to 1949. It is on file at Statistics Netherlands. Two years stand out: 1940, the year World War II began for the Netherlands, and 1945, the year it ended. The high numbers for these two years, fly flat in the face of Durkheim's hypothesis that in times of war suicide rates are lower. Upon closer inspection two other years stand out too: 1941 with 647 suicides, and 1944 with 662 suicides. These are the lowest numbers for the period considered, implying that there still might be something in Durkheim's hypothesis that more integration lowers suicide.

SUICIDES BY PERSONS SUSPECTED OF POLITICAL CRIMES, 1944 TO 1947

To get a stronger grip upon what happened at the time of the liberation of the Netherlands, we coded for all suicides from 1944 to 1948 comments written on the judicial

forms. We counted whether or not something was said about a person's 'war past', like 'political reasons', 'fear of being arrested', 'member of the National Socialist Movement', and 'in a prison for collaborators'. We assumed that the end of World War II and the return from London of the Dutch Queen with her ministers placed a particular kind of persons outside society, increasing their chances of suicide. Whereas we hold that the termination of World War II increased the chances of suicide for certain persons, Durkheim and Halbwachs presupposed that a war lowered the likelihood of suicide for the inhabitants of a country taken together.

All in all we found 113 suicides of persons suspected of political crimes: 11 in 1944, 88 in 1945, 7 in 1946, and 7 in 1947. It should be clear that these numbers are low estimates, since we cannot say that if a judicial form contained no write in, the person who committed suicide was not suspected of a political crime. For 78 cases we know when the suicide occurred: 18 before arrest, 19 at the police station, 40 in camp or prison, and one after release.

Table 2. Absolute number of suicides in the Netherlands in 1944 and 1945, after the month a person died and whether the person could be classified as suspect of a political crime or not

	1944			1945		
	Political crime	**Not**	**Total**	**Political crime**	**Not**	**Total**
January	0	48	48	0	72	72
February	0	52	52	1	68	69
March	0	65	65	1	73	74
April	0	62	62	17	96	113
May	0	73	73	19	91	110
June	2	47	49	18	71	89
July	0	49	49	8	69	77
August	1	60	61	6	83	89
September	5	50	55	5	79	84
October	1	41	42	3	82	85
November	0	49	49	9	65	74
December	2	51	53	1	62	63
Total	11	647	658	88	911	999

Source: own counts from judicial forms, therefore totals need not agree with Table 1.

For Table 2 we broke the political suicides for 1944 and 1945 down after the month in which the suicide occurred. The eleven political suicides for the whole year of 1944 stem to a large extent from the liberated part of the Netherlands, but some of these persons died of suicide before the Allied Forces arrived there. The highest number for this year occurred in September, the month the part of the Netherlands below the big rivers was liberated. The highest number for 1945, 19 to be exact, is for May 1945, the month when the German troops in the Netherlands surrendered to the Allied Forces. The 17 cases for April 1945 overrepresent persons suspected of political crimes from the eastern part of the Netherlands, which was liberated before the German occupier surrendered.

The total number of suicides in the Netherlands right before 1940 was some 800. This figure is to be compared with more than 1,000 suicides for 1945, of which at least almost 100

were committed by persons suspected of political crimes. The political suicides committed in 1944 did not become visible in the low totals for the whole of the Netherlands in that year, because the larger part of the Netherlands remained under German occupation. Yet, as 1945 the figures indicate, about 100 additional suicides remain unaccounted. So, possibly in these cases political suicides occurred without the judicial forms indicating so, suggesting that the 'motive' for suicide remained underreported.

We now are in a position to state that Durkheim's hypothesis that wars contribute to a population's integration, refers to wars fought on the battle field, but never resulting in the wholesale occupation of one country by another country. The situation in the Netherlands was quite different, and when the Netherlands regained its freedom, persons who collaborated with the German occupier feared ostracism, and they were jailed. From being highly 'politically integrated' they became 'public outcasts', resulting in higher chances of suicide.

If this explanation holds water, it should be possible to account for the high number of suicides in the Netherlands in 1940 in a similar way. As is clear from our historical overview, the German occupier of the Netherlands marginalized some persons more than others.

SUICIDES BY JEWISH PERSONS, 1940-1943

In 1940, after World War II had begun, Statistics Netherlands published the absolute number of suicides in the Netherlands for the various religious denominations. It commented on these figures by pointing out that in 1939 of all suicides 45% were committed by Protestants, who made up 58% of the population in 1930. Catholics formed 36% of the population and 23% of all suicides, and Israelites accounted for 1.4% of the population, and 3.7% of all suicides (List of primary sources: Statistics Netherlands: Crimineele Statistiek voor het jaar 1939).

The suicide figures we now present pertain not only to Israelite persons, but to all persons marked as 'full Jews' by the German race laws. To arrive at figures for 'racially Jewish' persons, we added to all Israelite persons, those persons with a write-in on their judicial form indicating that they had been marked that as Jewish. This, of course, is only possible for the war years, and we suspect that in the middle of World War II at least some judicial authorities classified persons without a denomination as 'Israelite', whereas these persons should have been given a write-in like 'persecuted as Jewish'. We think so, as the write-ins were most frequent for May 1940.

Table 3 breaks down the total number of Jewish suicides in the Netherlands in the years from 1936 to 1943 after the month in which people ended their life. Whereas the total number of suicides, for persons of any religious persuasion, in the Netherlands according to the coding cards for May 1939 was 70, 78 for April 1940, and 84 for June 1940, the total figure for May 1940 was 388 (time series on file at Statistics Netherlands).The highest number in Table 3 is for May 1940 too, with 210 Jewish persons ending their life. So, excess suicides in May 1940, for the larger part are accounted for by Jewish suicides.

Table 3. Absolute number of suicides in the Netherlands 1936-1943 by persons marked as 'full Jews' by the race laws of the German occupier, after the month a person died, and rates per 100,000 for 1936-1943.

	1936-1939 (average)	1940	1941	1942	1943
January	4	3	2	4	24
February	3	2	6	8	13
March	3	0	2	2	26
April	4	5	3	6	33
May	5	210	3	4	23
June	1	6	3	6	16
July	2	14	3	43	16
August	1	5	4	31	4
September	1	8	2	44	7
October	2	1	2	51	3
November	1	1	1	33	0
December	2	2	6	15	4
Total	29	257	37	247	169
Rate per 100,000	21	184	27	195	209

Source: own counts from short form coding cards.

Yet, the hypothesis that Jewish persons feared that the German occupier would take strong measures against them, does not account for all extra suicides. The surplus is 318 (388-70), leaving 108 (318-210) additional suicides by persons who were not Jewish. Still, our hypothesis suggests where a fuller explanation might be found: among Gentiles that feared National Socialist rule of the Netherlands. Indeed, it is known that at least three Dutch Gentiles who earlier on had argued publicly against National Socialism, committed suicide in May 1940 (10). Our account of the May 1940 figures is in line with our Durkheimian limited-integration explanation of the 1945 suicide figures.

We now pursue this line of explanation. According to Table 3 the absolute number of 247 Israelite suicides for 1942 is lower than that for 1940, which amounts to 257. The absolute figure for 1943 is 169, lower than that for 1942. However, these lower numbers do not mean that the Jewish suicide rate for 1943 was lower than that for 1942, and that the Jewish suicide rate for 1942 was lower than the rate for 1940. After all, large numbers of Jews had been deported form the Netherlands in the mean time. Since these figures are known (16), we estimated the monthly number of Jewish suicides per 100,000 Jews in Netherlands at the beginning of a month, with the yearly rate being the sum of these monthly rates.

In this way we arrived at the grim ladder of 21 suicides per 100,000 Jewish persons for 1936-1939, 184 for 1940, 27 for 1941, 195 for 1942 and 209 for 1943. This series squares with the hypothesis that as the German occupier had removed more Jews from society by transportation to camps outside the Netherlands, the chances of suicide for the remaining Jews rose. The year of 1941 seems like the calm before the storm, but its suicide rate of 27 is higher than the rate of 21 for 1936-1939. Indeed, the latter rate already is on the high side. According to write-ins it includes some ten suicides committed between 1936 and 1939 in Dutch hotels by Jewish refugees from Germany. At least some of these persons were about to

be returned by the Dutch authorities to Germany. It should be said too that German measures against Jewish civil servants and Jewish fortunes affected relatively few persons.

Of all the German measures against Jewish persons, the deportations affected the number of suicides most. This is the moment at which Jewish persons were forced to leave the house where that had been living. The limited-integration hypothesis leads us to expect that at this point in time Jewish suicide is highest. Table 4 breaks down the number of Jewish suicides after the municipality of residence of the victims of the German occupier, and the week in which persons ended their life. Transports from Amsterdam to Westerbork started on July 15, 1942, the first one from Rotterdam on July 30, and the first one from The Hague, the seat of the Ministries, on August 18, 1942. Transport from smaller towns in the Netherlands generally started after that date. The first train from Westerbork to Auschwitz also left July 15, 1942. In all three big cities few people showed up after having received a registered letter, and in all three of them people were being fetched from their home in September 1942 (10).

Table 4. Absolute number of Jewish suicides in the Netherlands in July-October 1942, after the week persons died and the municipality of residence of the deceased person

	Amsterdam	The Hague	Rotterdam	Other Dutch Municipalities
July 5-11	0	1	0	0
July 12-18	14	0	0	1
July 19-26	5	0	0	3
July 27-Agust 1	4	2	0	0
August 2-8	7	0	3	0
August 9-15	1	0	2	0
August 16-22	2	2	0	2
August 23-29	1	0	0	4
August 30-September 5	2	0	0	1
September 6-12	8	0	0	0
September 13-19	11	2	0	1
September 20-26	9	0	0	0
September 27-October 3	5	6	0	3
October 4-10	2	1	5	7
October 11-17	4	2	0	3
October 18-24	1	0	0	0
October 25-31	3	1	2	1

Source: own counts from short form coding cards.

The pattern in the municipal suicide numbers for Jews, as displayed in Table 4, agrees with these transportation dates and the changes in the way the German occupier assembled people for transport. The July-August configuration is: first Amsterdam, then The Hague, later Rotterdam, finally the rest of the Netherlands. The make-up for September-October is the same: suicides start in Amsterdam, The Hague follows, Rotterdam trails, the other Dutch municipalities bring up the rear. This corroborates the limited-integration hypothesis.

Durkheim's limited-integration hypothesis allows for more specific statements about the characteristics of the persons who took their life. In what follows we neglect 1941. After what has been shown, 1940 as the year in which World War II began, and 1942 and 1943, as the

years in which Jews were transported to camps, are important. We assume that suicide spread from the Jewish persons having experienced German authorities before May 1940, to Jewish persons who did not. We also hold that this diffusion process upset two established regularities in suicide statistics. The first one is that men have a higher rate than women, and the second that widowers have a higher rate than widows. When computing suicides rates for Jews of different nationality, gender and marital status, we once more lower figures for the population at risk for suicide. Discount factors are calculated from deportation figures (16).

To begin with, we postulate that Jews residing in the Netherlands with another nationality than the Dutch one or no nationality at all, will have been more likely to commit suicide in1940. After all, most of the Jews without Dutch nationality, entered the Netherlands after 1933 as refugees from National-Socialist Germany, and they will have had personal experience of what was in store for them in the Netherlands now. For 1940, we obtain a rate of 157 suicides per 100,000 Dutch Jews, and a rate of 327 for Non-Dutch Jews. This confirms a limited-integration hypothesis. Panel A of Table 5 gives the full series of figures.

The previous argument assumes a stronger fear in 1940 for the German occupier among Non-Dutch Jews than among Dutch Jews. Was this difference washed out as World War II continued? By 1942 the German occupier had measures in place against all Jews in the Netherlands. Assuming that Dutch Jews were from month to month as likely to be deported as Non-Dutch Jews, we found for 1942 a suicide rate of 181 for Dutch Jews, and of 222 Non-Dutch Jews. These rates show that the actual measures of the German occupier against Jews, as far as suicide goes, affected Dutch and Non-Dutch Jews almost to the same extent in 1942. However, in 1943 the rates diverge more, with one of 202 for Dutch Jews and a rate of 390 for Non-Dutch Jews. It is known that Non-Dutch Jews were the first ones to be called-up in the summer and autumn of 1942. Therefore, the convergence found for 1942 and the new gap for 1943 cannot be discounted by selective deportation. Were Dutch Jews more likely to believe that the camps in the East were labour camps, whereas Non-Dutch Jews had a bleaker view of what Germany intended? We are unable to shed more light on this finding, but found some evidence that deportations affected Non-Dutch and Dutch Jews to a similar degree.

Another elaboration of the limited-integration hypothesis is as follows. It is well-known that, generally, men are more likely to commit suicide than women. Was this the case too with Jewish men in the Netherlands during World War II, or did the deportations wipe out differences between Jewish men and Jewish women? Jews were told that they would go to work camps. If people believed this, women perhaps feared the future more than men, since they were less accustomed to heavy work. It even may be the case that the suicide rate for Jewish women surpassed the suicide rate for Jewish men.

Figures in Panel B of Table 5 turn out to support the hypothesis of a turn around in the suicide rate of Jewish men and Jewish women. In 1936-1939 the suicide rate per 100,000 Jewish men was 22, and 17 for Jewish women. This difference is as usual. Despite the big increase in the number of suicides in 1940, this difference persists. In that year the suicide rate for Jewish men was 217, and 151 for women. But in 1942 and 1943 the difference has turned around. The female rate for 1942 is 218, higher than the male rate of 155 for that year. And the female rate for 1943 is 275, higher than the male rate if of 186. Our calculations for suicide rates assume that Jewish women were as likely to be deported as Jewish men. This supposition is on the mark, since the German occupier deported families. So, in the Netherlands in 1942 and 1943, against one of the most persistent findings in suicide research, Jewish women were more likely to die of suicide than Jewish men.

Table 5. Suicides by Jews according to nationality, gender and marital status in the Netherlands 1936-1943, absolute numbers and rates per 100,000

		1936-1939	1940	1941	1942	1943
(A)						
Non-Dutch	absolute numbers	8	72	8	46	45
	Rates per 100,000	36	327	36	222	390
Dutch	absolute number	19	185	30	200	124
	Rates per 100,000	16	157	25	181	202
(B)						
Male	absolute numbers	15	148	19	99	66
	Rates per 100,000	22	217	28	155	186
Female	absolute numbers	12	109	19	147	103
	Rates per 100,000	17	151	26	218	275
(C)						
Married men	absolute numbers	7	96	10	64	37
	Rates per 100,000	28	269	28	192	200
Widowers	absolute numbers	3	10	3	14	12
	rates per 100,000	118	392	118	592	914
Married women	absolute numbers	6	57	2	56	43
	Rates per 100,000	18	171	6	179	248
Widows	absolute numbers	2	16	9	45	29
	Rates per 100,000	28	228	128	685	797

Source: absolute numbers own counts from short form counting cards, rates take deportations into account.

Our final elaboration of the limited-integration hypothesis runs as follows. The deportations ordered by the German occupier in most cases amounted to the deportation of couples with their children. That is, without anyone close to support them or to live for, the fear of leaving the Netherlands for widowed persons well may have been strongest, and stronger for widows than for widowers. It is known from suicide research that at least in times of peace widowers are more likely to commit suicide than widows. Did the Netherlands during World War II witness a reversal of this difference?

Suicides rates per 100,000 for married and widowed Jewish persons are presented in Panel C of Table 5. In all years, widowed Jewish persons, whether males or females, were more likely to die of suicide than married Jewish persons. But whereas Jewish widowers were more likely than Jewish widows to die of suicide in 1936-1939 and 1940, in 1941 and 1942 Jewish widows were more likely to commit suicide than Jewish widowers. In 1943 rates for Jewish widowers were higher than for Jewish widows, but this difference does not speak strongly against the reversal we predicted with our limited-integration hypothesis.

SUICIDES BY NON-JEWS 1940-1945

In Table 6 we return to the question of whether suicide for Non-Jewish persons dropped during World War II and to Durkheim's hypothesis that in times of war suicide rates are

lower than in times of peace. Table 1 showed low totals for 1941 and 1944, what does the time series for non-Jews show? This time the suicide figures for 1941, 1942, 1943 and 1944 are below the level for the pre-war years, and the total number of Non-Jewish suicides for 1940 is even below that for 1938. So, while the German occupier of the Netherlands placed Jews farther and farther away from the core of society, non-Jews, if Durkheim's limited-integration thesis holds, became in the face of German occupation a more tightly knit group.

Table 6. Absolute numbers of suicides by Non-Jews, Netherlands 1936-1949

1936	736		1943	668
1937	713		1944	656
1938	792		1945	1018
1939	708		1946	831
1940	781		1947	688
1941	610		1948	688
1942	632		1949	671

Source: Tables 1 and 3.

Why did not this unity of non-Jews lead to more resistance of non-Jews against the measures the German occupier took against Jews? This has been a moral issue overhanging Dutch society since the end of World War II. In the past few decades it became a topic of research for social scientists (18). There is some evidence that the pillarization of Dutch society, its segmentation into religious groups that do not meet, to some extent accounts for this (19).

CONCLUSION

Scholars who studies Jewish suicide before and during World War II, have been somewhat at loss with this phenomenon. Yahil, at the end of her huge volume, deems it a difficult subject worthy of further study (20). Kwiet and Eschwege present the few figures for Jewish suicide in National-Socialist Germany, and regard it as 'an act of resistance' and 'the ultimate refuge'. That is true, but perhaps not very enlightening. However, Kwiet and Eschwege capture the increasing intensity of Jewish persecution, by drawing a time line for the yearly number of Jewish persons who committed suicide and were buried between 1933 and 1945 at Weissensee, the last Jewish graveyard being used in Berlin, the capital of Germany (11). Here we presented a more detailed and equally telling picture for all Jews in the Netherlands. As Jewish persecution intensified, Jewish suicide rates rocketed.

A reader may have noted a drift in the explanation we advanced for the regularities in suicide numbers for the Netherlands during World War II. The original argument was that Jews were being placed outside society, but the underlying theme more and more became that the German occupier not only deprived Jews of their right to own money, to have a business, and to shop where they wish. The German occupier denied them a place to live in the country where they were born, and the increasing strength of Jewish persecution will have made every one ponder the issue of whether Jews were being denied the right to live. If all the measures

of the German authorities against the Jews are reviewed, it becomes clear that the German authorities not simply marginalized Jews, but that Jews were subjected to so many rules that more and more Jews no longer deemed life worth living, and that Jews would not be able to lead a life in the country where they had been living. So, not only Durkheim's limited-integration hypothesis is applicable, but also Durkheim's too-many-norms hypothesis.

Yet Durkheim's expression 'fatalist suicide' miscasts the regularities for Jewish suicide in the Netherlands during World War II. Jews did not underestimate the chances they had for survival under German occupation, they had a quite accurate perception. Indeed, write-ins on judicial forms for Jewish suicide during World War II in the archive of Statistics Netherlands, like 'fear psychosis' encountered for May 1940, make way for comments such as 'Jewish persecution' in 1942, and 'fear for transportation to Poland' in 1943.

PRIMARY SOURCES

Maandschrift van het Centraal Bureau voor de Statistiek, 1940.

Netherlands Institute for War Documentation: Archief Joodsche Raad voor Amsterdam, Inventarisnummer 182-36d.

Rijksinspectie van de Bevolkingsregisters: Statistiek der bevolking van joodschen bloede in Nederland. Den Haag, Algemeene Landsdrukkerij, 1942.

Statistics Netherlands: Crimineele statistiek over het jaar 1939 en 1940. Den Haag, Rijksuitgeverij.

Statistics Netherlands: Zeventig jaren statistiek in tijdreeksen 1899-1969. Den Haag, Staatsuitgeverij, 1969.

Statistics Netherlands: Centraal Archief. Depot, Kostengroep 0307, Dozen 8216114 tot en met 8216149.

LITERATURE

[1] Ultee W, Van Tubergen F, Luijkx R: The unwholesome theme of suicide. Forgotten statistics of attempted suicide in Amsterdam and Jewish suicides in the Netherlands for 1936-1943. Edited by Brasz C, Kaplan J. *Dutch Jews as perceived by themselves and by others*. Leiden, Brill, 2001, pp 325-353.

[2] Van Tubergen F, Ultee W: Political integration, war and suicide. The Dutch paradox? *International Sociology* 2006; 21:221-336.

[3] Durkheim E : *Le suicide. Étude sociologique.* Paris, Alcan, 1897.

[4] Hoyer G, Lund E: Suicide among women related to the number of children in marriage. *Archives of General Psychiatry* 1993; 50:134-137.

[5] Axell A, Kase A: *Kamikaze. Japan's suicide gods*. London, Pearson, 2002.

[6] Halbwachs M : *Les causes du suicide.* Paris, Alcan, 1930.

[7] Verrijn Stuart CA: *Inleiding tot de beoefening der Statistiek. De toepassing der statistische methode op de zedelijke en verstandelijke eigenschappen van den mensch*. Haarlem, Bohn, 1913.

[8] Van Tubergen F, Te Grotenhuis M, Ultee W: Denomination, religious context, and suicide : neo-durkheimian multilevel explanations tested with individual and contextual data. *American Journal of Sociology* 2005; 111:797-823.
[9] Speijer N: Suicide in Jewish history. *Folia Psychiatrica, Neurologica et Neurochirurgica Neerlandica* 1948; 51:263-275.
[10] De Jong L: *Het Koninkrijk der Nederlanden in de Tweede Wereldoorlog*. Den Haag, Staatsuitgeverij, 1969-1991 (13 volumes).
[11] Kwiet K, Eschwege H: *Selbstbehauptung und Widerstand. Deutsche Juden im Kampf um Existenz und Menschenwürde 1933-1945*. Hamburg, Christians,1986.
[12] Lijphart A: *The politics of accommodation, pluralism and democracy in the Netherlands.* Berkeley, University of California Press, 1968.
[13] Hendrickx J, Lammers J, Ultee W: Religious assortative marriage in the Netherlands, 1938-1983. *Review of Religious research* 1991; 33: 123-145.
[14] Moore, B: *Victims and survivors. The Nazi persecution of the Jews in the Netherlands 1940-1945*. London, Arnold, 1997.
[15] Kooy, GA: *Het échec van een 'volkse' beweging*. Assen, Van Gorcum, 1964.
[16] Hirschfeld, G: Niederlande. Edited by Benz, W: *Dimension des Völkermords. Die Zahl der jüdischen Opfer des Nationalsozialismus*. Oldenbourg, München, 1991.
[17] Gutterman, B, Shalev, A: *To bear witness. Holocaust remembrance at Yad Vashem*. Jerusalem, Yad Vashem, 2005.
[18] Verese F, Yaish M: The importance of being asked, the rescue of Jews in Nazi Europe. *Rationality and society* 2000 12:307-334.
[19] Tammes P, Ultee, W: De Duitse bezetting, de verzuildheid van Nederlandse gemeenten, de overlevingskansen van hun joodse inwoners. Edited by Boonstra O, Doorn P, Van Horik R, Van Maarseveen J, Oudhof J: *Twee eeuwen Nederland geteld*. Den Haag, Dans, 2007, pp. 395-419.
[20] Yahil L: *The fate of European Jewry 1932-1945*. New York, Oxford University Press, 1990.

PART II: STRESS AND SUICIDE

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 8

STRESS AND SUICIDAL BEHAVIOR

Eduardo J. Aguilar[1], Samuel G. Siris[2] and Enrique Baca-García[3]
[1]Hospital de Sagunt, Sagunto (Valencia), Spain; Centro de Investigación Biomédica en Red de Salud Mental (CIBERSAM), Madrid, Spain
[2]Zucker-Hillside Hospital, North Shore - Long Island Jewish Health System, Glen Oaks, New York, USA
[3]Universidad Autonoma de Madrid, Madrid, Spain; Columbia University, New York, New York, USA

ABSTRACT

Suicide and stress are intimately related. The stress-diathesis model is today the best framework to start to understand the complex mechanisms interacting throughout this relationship. The serotonin and stress systems are also closely related and, together with genetic mechanisms, constitute key biological underpinnings of suicide.

Environmental factors interact with these gene and biochemical mechanisms in a lifelong process that may end up in suicidal ideation and behavior. Childhood adverse experiences and proximal life events have been shown to respectively predispose and trigger suicidality. Mental disorders are the strongest predictors for suicide. Although affective disorders and alcoholism are particularly linked to suicide, stress-related mechanisms may also play a role in other disorders. In particular, post-traumatic stress disorder is a well-defined stress syndrome potentially associated to suicide. It is therefore an interesting condition when trying to clarify the relationship between stress and suicide.

Neuroimaging and physiological studies centered on suicidal behavior occurring in patients diagnosed of diverse pathological conditions are needed. A better understanding of the role of stress in such conditions will also be helpful to disentangle the biological basis of suicide and to develop more effective prevention strategies.

This chapter will approach these concepts by reviewing the level of evidence of each element pertaining to the stress-diathesis model applied to suicide.

INTRODUCTION

Suicide remains today as a major cause of death in psychiatric patients, and many uncertainties continue concerning its etiology and pathogenic mechanisms. These questions contribute to making this pervasive and tragic outcome so difficult to anticipate and prevent.

The currently most accepted approach to understanding suicide behavior is the stress-diathesis model, which has been advocated by many authors. In this model, stressors are external adverse influences on the individual and diatheses are internal vulnerabilities. These factors constitute sets of situations which can increase the difficulty of preserving appropriate biopsychosocial homeostasis protective against suicide, and which can occur in any of the following domains: chemical, physiological, psychological, interpersonal, and socio-cultural. Examples (internal and external) of the chemical domain include genes and substance use. Similarly, internal and external examples in the physiological domain include the hypothalamic-pituitary-adrenal (HPA) axis and the experience of head trauma. Examples (internal and external) in the psychological domain include the ability to tolerate affect and/or delay behavior and the intrusion of current adverse life experiences. Examples (internal and external) in the interpersonal domain include the capacity to express oneself effectively and the status of current salient relationships. And examples (internal and external) in the socio-cultural domain include specific-to-the-individual environmental needs and the particular "fit" of available societal resources. Each of these domains, in turn, is modified by its adjacent domains as depicted in Figure 1.

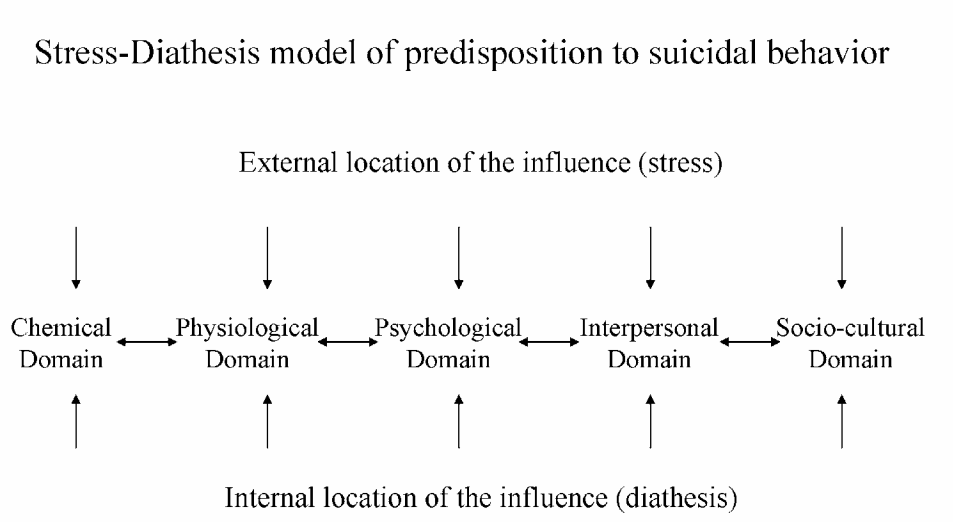

Figure 1.

Blumenthal (1988) (1) described a threshold model which was essentially similar to the later called stress-diathesis model proposed by Mann and Arango (1992) (2). These authors classified risk factors as trait- or state-dependent or, in other words, constitutional and precipitating factors. They emphasized the role of the serotonin system as a trait risk factor and the fact that some risk factors such as biological ones could be of both types. For them, suicidal behavior would be the result of a combination of factors across the domains of

psychopathology, genetics, early life experience, family interactions, social stress, physical illness, and neurobiology. In this line, Mościcki (1995) (3) proposed a division between distal (including psychopathology, substance abuse, adverse events in childhood and both familial and biological vulnerability) and proximal (such as stressful life events and availability of suicide methods) risk factors. By the end of that decade, Mann et al. (1999) (4) wrote a seminal paper defining a framework for the stress-diathesis model to be applied into suicide research. They studied the presence of suicide attempts in well-defined axis I and II diagnostic categories. Lifetime aggression and impulsivity, comorbid borderline personality disorder, smoking, past substance use disorder or alcoholism, family history of suicidal acts, head injury and childhood abuse history were more frequent in suicide attempters. In their model, the risk of suicide was determined by a diathesis and a stressor, particularly a psychiatric illness. The diathesis would be associated to a predisposition to have more suicidal ideation. In addition, comparisons of impulsivity and aggression among USA and Spain samples of suicidal attempters and healthy controls have suggested that the greater lethality of suicidal behavior in USA than Spain is related to higher aggression whereas the impulsivity is similar in USA and Spanish suicide attempters and greater than controls (5).

Stress has become a crucial aspect for understanding suicide. In this line, Wasserman (2001) (6) depicted a stress-vulnerability model that emphasized the development of the suicidal process from suicidal ideation to suicide. According to this author, stress is present throughout the process. A balance between risk and protective (internal and external) factors is crucial. Moreover, this process should be studied at an individual, interpersonal and community-social-cultural level.

Although there is not a universally accepted definition of stress, commonly accepted elements include a physiological reaction to a change-challenge requiring physical, mental or emotional adjustment. Key elements of this physiological reaction include the HPA axis, the stimulation of the sympathetic nervous system and adrenalin secretion. Two authors have been highly influential for the present concept of stress: Cannon's concept of "homeostasis" as a set of acceptable ranges of values for internal variables and Seyle's concept of stress as a non-specific (uniform) response of the body to any demand for change (7). He further hypothesized that prolonged stress could produce physical disease and mental disorders, a concept which is now widely accepted (7). Stress is now understood as a more complex condition in which the response is somewhat specific depending on the characteristics of both the stressor and the organism that reacts to it.

Allostatic load is referred to the effects of prolonged activation of effectors of the cardiovascular system (such as blood pressure) physiologically used to attain adaptation (stability). This concept provides a conceptual framework for the understanding of long-term consequences of stress. Strategies to alleviate chronic stress and reduce allostatic load may help to reduce stress burden and the incidence of stress-related disorders (8). Distress implies a conscious experience in regard with a negative condition that supposes a challenge for the organism and the perceived ability to cope with it. Resilience is another relevant concept that implies the ability to cope with stressors. It includes the processes implemented by each person to prevent the development of a mental disorder.

In this context, diathesis can be understood as a predisposition to suicide and determines an individual's response (suicidal behavior or ideation) to a stressor. Stress is crucial in this model since not only it includes all precipitant factors that can be conceptualized as stressors but also is part of the diathesis (predisposing factors), namely, distal stressors such as

childhood adverse experiences, and stress-related physiological systems and genetic polymorphisms. Stress is intimately related to suicidality both in proximal and distal terms and both as a cause and a consequence of suicidal ideation and behaviors. It is also evident that stress is closely related to several psychiatric disorders. Since these psychiatric disorders, particularly depression, are also strongly related to suicidal behavior, causality is hard to establish. First of all, biological correlates of the stressors for suicidal behaviors such as the primary psychiatric disorder have to be distinguished from the biological correlates of the diathesis for suicidal behaviors. Interestingly, serotonergic impairment related to depression is independent of the serotonergic abnormality implied in the diathesis for suicidal behavior (9).

In this chapter we will focus especially on a) biological vulnerabilities consisting of abnormalities in both the serotonergic system and the stress-system (HPA axis and/or monoaminergic systems) and genetic factors, and b) environmental factors that act as stressors both remotely (early traumatic life experiences) and proximally (psychiatric illnesses and current adverse life events) (Figure 2).

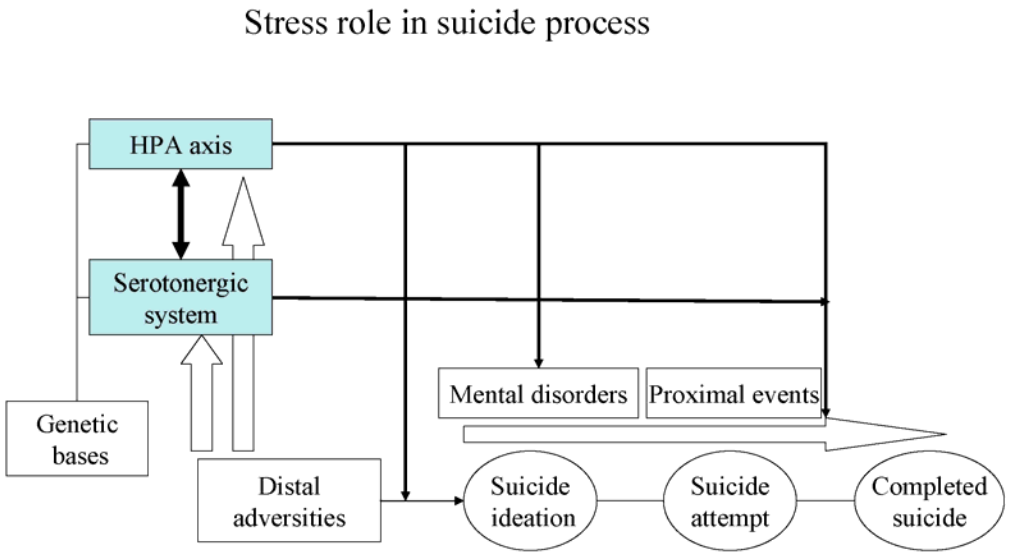

Figure 2.

NEUROPHYSIOLOGICAL BASIS OF SUICIDE

In the literature to date, the stress-diathesis model of suicidal behavior has focused particularly on two systems: the serotonin system (mainly represented by low 5-hydroxyindoleacetic acid in cerebrospinal fluid (CSF 5-HIAA) and dysfunction of the HPA axis, frequently represented by non-suppression in the dexamethasone suppression test (DST). A number of other systems, including adrenergic, dopaminergic, GABAergic and glutamergic systems may also be involved but results are less consistent.

Serotonergic System and Suicide

Åsberg et al. (1976) (10) first showed that low CSF 5-HIAA (principal metabolite of 5-HT) was associated to suicide risk. They studied 68 depressed patients and demonstrated a bimodal distribution of CSF 5-HIAA. Low 5-HIAA was associated to more frequent and more violent suicide attempts (10). This was later confirmed by a meta-analysis of 27 studies (11) and was also extended to completed suicides (12).

According to Mann and Arango (2001) (9), data supporting a specific role of serotonin in suicide risk comes from 3 main venues:

(a.) Low levels of CSF 5-HIAA have been associated to suicidality across several psychiatric disorders.
(b.) Platelet measures and (blunted) prolactin responses to fenfluramine point at abnormalities in the serotonin system that are proportional to the seriousness of the attempt.
(c.) Reductions in serotonergic function in suicide victims are associated with suicidality rather than with traditional categorical psychiatric diagnoses. These data support a specific association between this parameter and suicide risk.

Some but not all studies have showed fewer serotonin transporter sites in suicide victims. Arango et al. (1995) (13) showed that 5-HT_{1A} receptor binding was increased in several brain areas of suicide patients. This increase, which is thought to reflect upregulation, was more pronounced in the ventrolateral prefrontal cortex (PFC). However, Ono et al. (2002) (14) did not find significant differences in Tryptophan hydroxylase (TPH) (rate-limiting enzyme in serotonin biosynthesis) or $5HT_{2A}$ receptor density in dorsolateral PFC between suicide victims and controls. Aggresiveness may also be a confounding factor helping to explain these discordant results. Thus, Oquendo et al. (2006) (15) studied 5-HT_{2A} receptor binding in the PFC of completed suicide patients and nonsuicide patients with a variety of diagnoses and its relationship with lifetime aggression. Only in suicide subjects lifetime aggression correlated positively with 5-HT_{2A} receptor binding. However, no significant differences appeared in aggression scores or 5-HT_{2A} receptor binding between both groups of subjects.

On the other hand, low CSF 5-HIAA has also been linked to impulsiveness and aggresion which could be mediators for suicidal behaviors (16). An acceptable level of evidence supports that the serotonergic system is partly under genetic control. Mann and his collaborators have proposed several intermediate phenotypes including impulsivity, aggressiveness and biological abnormalities (17). This is important since, if proven, both research and treatment strategies can be addressed to these intermediate phenotypes.

Stress System and Suicide

HPA axis is particularly relevant for the purposes of this chapter since this system mediates acute stress responses (including psychiatric disorders) and its hyperactivity has been associated to suicide risk, particularly completed suicides. In general, the relationship between suicide attempts and dysfunctionality of this system has been less consistent.

An early study by Bunney and Fawcett (1965) (18) first reported high levels of 24-h urinary 17-hydroxycorticosteroids in 3 patients who completed suicide. The last decade has yielded more robust evidence for this association. Westrin et al. (1999) (19) reported stress system alterations in suicidal patients with mood disorders, namely high cortisol, low corticotrophin-releasing hormone (CRH) and low neuropeptide Y in patients who had recently attempted suicide. Westrin and Nimeus (2003) (20) reported an association between nonsupression in the DST and clinical indicators of suicidality (high scores of the Suicide Assessment Scale and the Montgomery Asberg Depression Rating Scale). Completed suicide is also associated with DST nonsupression (21), but this may be particularly true for depressed patients (22). Thus, DST nonsuppressors with mood disorders have a 4.6-fold increased risk for dying of suicide (23). Further support comes from an early study that reported fewer CRH binding sites (down-regulation) in the PFC of 26 depressed suicide victims compared to controls (24). Finally, other HPA axis indexes such as elevated pre-sleep cortisol (25), diminished plasma cortisol response to fenfluramine (26, 27) and lower CSF CRH (28) have also been associated to suicide.

The precise role of HPA axis on the biological underpinnings of suicide is yet unclear. Thus, Lindquvist et al. (2008) (29) demonstrated that hypocortisolism (HPA axis hypoactivity) was associated to suicide attempts in a follow-up study of 12 years. They measured CRH in CSF and urinary cortisol after a suicide attempt and salivary cortisol 12 years later. Evening salivary cortisol was lower in suicide attempters compared to controls. The same group had previously reported lower levels of CRH in CSF of suicide attempters that were still lower after 7 months (30). They have also found an inverse relationship between rated suicidal intent and post DST cortisol levels in major depressive disorder (MDD) suicide attempters (31). Other studies have also reported hypocortisolism in suicidal patients (32). In this retrospective study, suicidal behavior in depressed patients, including past and recent suicide attempts as well as suicidal ideation, was associated with a lower adrenocorticotropin and cortisol response in the combined dexamethasone-suppression/CRH stimulation test, with lowest hormone levels observed in patients with a recent suicide attempt (32). A possible explanation for these discrepancies comes from a model according to which chronic stress (after initial HPA axis hyperactivity) would wear out the stress system provoking a switch into a hypoactive mode which, in turn, might even be protective for the organism (33).

On the other hand, other hormones such as vasopressin or oxytocin may interfere with the regulation of the HPA axis which is also regulated by feedbacks mediated by mineralocorticoid and glucocorticoid receptors (34). Peptides such as orexins may also mediate the role of HPA axis in suicide. Low CSF-orexin is related to depressive symptoms and with low CRH levels in suicide attempters with MDD. Interestingly, this peptide increases significantly during the first year after the suicide attempt and this increase is associated to lower clinical assessments of suicidality possibly reflecting a recovery of a previously overstressed hypothalamus (35, 36).

Relationships between Both Systems

In general terms, serotonergic system alteration is a well-known risk factor that is basically trait-dependent. On the other hand, NA system is part of the stress response and

seems to be more state-dependent. However, the environment, including early (traumatic) events, seems to conditionate both the stress response and serotonergic function. Early-life stress has an effect on the development and functioning of the serotonergic system in adulthood which could be involved in suicide risk (37). As we have already mentioned, aggressiveness and impulsivity could mediate this phenomenon.

Data supporting the relationship between both systems come from animal studies that support the hypothesis that stress affects 5-HT neurotransmission partly through the actions of corticoids (38, 39). This relationship is also supported by human studies although it might behave with different parameters in suicide attempters and non-attempters, at least in depressed patients (40). In this study, serum cortisol at 4.00 p.m. correlated positively with CSF 5-HIAA in depressed inpatients with an index suicide attempt, but not in the non-attempters (40). On the other hand, the serotonergic system is involved in the regulation of stress response and HPA axis activity (41). Therefore, individuals who have lower 5-HT function because of genes or early environment effects would show altered HPA axis function (37).

Stress, Suicide and Neuroimaging

Resting PFC hypoperfusion or hypometabolism in suicide attempters has been shown in Positron Emission Tomography (PET) and Single-Photon Emission Computed Tomography (SPECT) studies. This hypofrontality could be related to a deficient serotonergic neurotransmission according to serotonergic transporter and receptor ligand, and pharmacological challenge studies (42).

PFC is probably involved in stress response as an inhibitory structure. On the other hand, the amygdalae would be implied in evoking fear and stress responses in front of challenging stimuli. Interestingly, both structures are innervated by the raphe nuclei and serotonin might play a key role in the functional connectivity between them (43). In this line, Mann and Arango (2001) (2) postulated that serotonergic input to that area of the brain is involved in behavioral inhibition, and that impairment of this input or damage to this area results in behavioral disinhibition (potentially suicidal behavior).

Structural studies may also be helpful to disentangle the biological bases of suicide. Interestingly, the first reports point at similar key structures. A study showed that women with unipolar depression and a history of suicide attempts had smaller right and left orbitofrontal cortex grey matter volumes than healthy women do. These same patients displayed larger right amygdala volumes than women with unipolar depression who were not suicidal (44). Two studies have also approached this issue in patients with schizophrenia. The first of them demonstrated gray matter density reductions in the left orbitofrontal cortex and left superior temporal gyrus in schizophrenic patients who had previously attempted suicide compared to similar patients without antecedents of suicidal behaviors (45). A second study that included a healthy control group did not find grey matter differences but instead larger inferior frontal white matter volumes bilaterally in patients with a previous suicide attempt in comparison with non-suicidal patients (46).

Genetic Bases for Suicide

There is a good level of evidence indicating that suicidal behavior is influenced by genetic factors that are at least partly independent of traditional psychopathological findings. Data come from adoption, twin and family studies (47). Although varying data have been reported, genetic factors may account for up to 45% of the variance in suicidal thoughts and behavior as has been shown in twin studies (48, 49). According to Fu et al. (2002) (49), model-fitting suggested that suicidal ideation was influenced by genetic effects in 36% and suicide attempt in 17%. This genetic load is not fully explained by the inheritance of psychiatric disorders.

Linkage and association studies with candidate genes gave further support to the heritability of suicidal behavior. However, association studies have yielded inconsistent results. Several meta-analyses on serotoneregic candidate polymorphisms have been published (50-53). Genome-wide studies are now being implemented and may be particularly helpful since many genes and epigenetic factors are probably involved in the diathesis for suicidal behavior (see 37 for a review).

Genetic studies are now centered on gene-environment interactions after Caspi et al's (2003) (54) seminal study on serotonin transporter genotypes that, regrettably, did not report on suicidality regarding with child maltreatment and genotype interactions. Gibb et al. (2006) (55) have pursued this issue by demonstrating that 5-HTTLPR genotype moderated the link between sexual and physical (but not emotional) abuse and adult suicidal behaviour. Although serotonergic system has been mostly studied, the noradrenergic system has also been investigated in relation with suicidal behavior because of its involvement in the regulation of stress response and a meta-analysis gives some support for this relation (56). Genes involved in the noradrenergic system and HPA axis have not yet been showed to be good candidate genes for studying suicidal behavior. As Currier and Mann (2008) (37) have remarked, studies investigating the genetic and gene/environment influences on basal HPA axis function and response to stressors are necessary for elucidating the genetic contributions to suicidal behavior (37). According to these authors, two perspectives should be considered. Firstly, early life stress damages certain neurobiological systems believed to be involved in suicide through behavioral, affective and cognitive mechanisms. Secondly, impairments in stress response systems may be directly involved in suicide. Genes would contribute in both cases. Further studies examining early-life stress, biological markers and intermediate phenotypes or endophenotypes are needed to elucidate the relationship between stress, genes, and suicidal behavior (37). Biological and clinical endophenotypes are now being researched in all psychiatric conditions. Considering the likely gene-gene and gene-environment interactions and the complexity of the neurobiological basis of suicide, they are of particular interest in this field (57). Thus, in a recent workshop convoked by the American Foundation for Suicide Prevention, the Department of Psychiatry at Columbia University, and the National Institute of Mental Health, the experts identified the most promising endophenotypes as being trait aggression/impulsivity, early-onset major depression, neurocognitive function, and cortisol social stress response. According to these authors, systematic studies should be implemented with these, and probably other, endophenotypes through genome-wide structural and expression arrays and superimposed mapping of methylation sites (57).

ENVIRONMENT AND SUICIDE

Distal (Childhood) Adverse Experience and Suicide

Childhood adverse experiences (parental separation, dysfunctional parent-child relationships, sexual, physical or emotional abuse and family violence) are related to suicidal behavior in young people and, although less strongly, in adults (58). Further experiences may enhance or diminish the effect of these early experiences. Enns et al. (2006) (59) studied the association between childhood neglect and abuse and suicidality in a large community mental health survey in the Netherlands and reported odds ratios that ranged from 2.80 to 4.66 for new onset suicidal ideation and from 3.60 to 5.43 for new onset suicide attempts. The effects were cumulative and still significant after controlling for the effects of mental disorders. Data from substance dependent patients suggest that these adversities can also influence the age of onset of suicidal behavior (60).

General population studies give strong support to the association between early adverse events and suicide. Afifi et al. (2008) (61), using data from the US National Comorbidity Survey Replication, showed that having experienced any adverse childhood event accounted for a substantial proportion of suicide ideation and attempts among women (16% and 50%, respectively) and men (21% and 33%, respectively). Pagura et al. (2008) (62) used data from the National Comorbidity Survey and the National Comorbidity Survey Replication to show that subjects with a history of multiple suicide attempts had a significantly higher presence of traumatic events in childhood than those with single suicide attempts. Finally, a prospective, population-based study reported data on a school cohort followed since age 6 to their early twenties and identified five common factors in the suicidal diathesis, one of them being childhood anxiousness and abuse (63).

Fergusson et al. (2000) (64) reported on a 21-year longitudinal study of a birth cohort of 1265 children born in New Zealand. High risk of suicidal behavior was associated to several factors including socio-economic adversity, marital disruption, poor parent-child attachment and exposure to sexual abuse. Mediators included mental health problems and exposure to stressful life events in adolescence and early adulthood. Their data come along with other authors' models (6) emphasizing suicide as a process where accumulative exposure to different types of stressors progressively enhance suicide risk. In other words, early adverse life experiences may be relevant for determining the so-called allostatic load later in life (65). On the contrary, resiliency (protective) factors may hamper this risk (66). Both risk and resiliency factors are similar to those implicated in the pathogenesis of mental disorders. Therefore, primary prevention programs may be beneficial for all these conditions. Impulsivity may be one of these targets. In fact, childhood abuse has been linked to suicidal behavior and impulsivity in adulthood (67).

Finally, some stressors may be particularly relevant as risk factors for suicide. Childhood sexual abuse is probably one of them even controlling for psychopathology and other adversities (68-70). However, other studies have not found this specifity (62). A study of suicide attempters has given some support for the specific role of sexual abuse after demonstrating this to be associated to higher levels of CSF methoxy-4-hydroxyphenylglycole and urinary noradrenaline/adrenaline (71). Although this study has some methodological flaws including a small sample, many dropouts and a retrospective assessment of life events

at the follow-up instead of at index point, it merits comment for approaching such a relevant issue from the biological point of view.

Proximal Life Events and Suicide

The fact that suicide is often precipitated by immediate adversities is accepted by most clinicians and researchers. Strong empirical support came from a well-known nationwide Finnish psychological autopsy study that showed how stressful life events were present in 80% of suicides in the three months prior to death (72).

Suicidal behaviors may be precipitated by many different types of stressors, maybe with some sort of specificity. Belik et al. (2007) (73) used data from the US National Comorbidity Survey Part II and reported that interpersonal traumas and exposure to three or more types of traumatic events were particularly associated with suicidal behaviors after controlling for sociodemographic variables, mental disorders, and physical disorders.

On the other hand, each phase of the life cycle may have a somewhat specific risk profile for suicidal behaviors. In young people, most data come from short-term life events (mainly interpersonal losses), unemployment and sexual orientation (58). In adults, the key life events are interpersonal losses and conflicts, financial difficulties and job problems. Resiliency factors would include cognitive flexibility, good self-esteem, problem-solving skills, social support, positive school experiences and spiritual faith (58). In a psychological autopsy study, suicide in older people was particularly associated to financial, accommodation, retirement and long-term bereavement-related problems (74).

Natural disasters and terrorist attacks give the opportunity of prospectively study these mechanisms. Kessler (2008) (75) studied a representative sample 5-8 months after the hurricane Katrina and again 1 year later. Suicidal ideation along with other mental disorders increased during this period. Unresolved hurricane-related stresses accounted for a large proportion of the suicidality (61.6%). Although not investigating suicide, a magnetic resonance study by Ganzel et al. (2008) (76) yielded interesting results for understanding how our brain reacts to stress. More than 3 years after 9/11/01, adults that were closer to the terrorist attack had lower grey matter volume in amygdala, hippocampus, insula, anterior cingulate, and medial prefrontal cortex. Interestingly, amygdala gray matter volume and function were related to the total number of traumas in lifetime and anxiety (76).

Many doubts remain about the mechanisms linking life events and suicidal intent. A gender effect should not be discarded and individual variability is also relevant. Thus, therapeutical interventions have to be individually tailored (77).

STRESS, SUICIDE AND MENTAL DISORDERS

Mental disorders are the strongest predictors of suicidal behaviors in adults. However, many psychiatric patients will never attempt or commit suicide. A biological approach may enhance our predictive capacity to detect suicide risk in distinct disorders. In this line, some studies have reported HPA overactivity in relation to suicidality in patients with different

psychiatric disorders (32, 78-80). Anyway the strength association between stress (OR > 10) and suicidal behavior is higher than biological findings in suicidal behavior (OR = 1–2) (81).

Several studies have examined the role of particular mental disorders as stressors for suicide based on biological parameters associated to suicidality. Personality and anxiety disorders, alcoholism, affective disorders and non-affective psychoses are good candidates for this type of study.

Westrin et al. (2003) (82) studied the influence of personality disorders on the DST in 184 patients with a recent suicide attempt and 42 healthy controls and showed that patients with suicide attempts and an Axis II personality disorder, particularly of cluster B type, presented hypocortisolism compared to other diagnoses (82). Again, in a prospective study with 26 patients, suicidal attempt repeaters more often tended to have a personality disorder and hypocortisolism (83).

Two frequently occurring as comorbid disorders, namely, anxiety (84) and alcoholism (85) seem to be directly associated to suicide and also enhance suicide risk when other mental disorder is present. It has been suggested that acute alcohol use can precipitate suicidal behaviors by inducting negative affect and impaired problem-solving skills, and also aggravating impulsiveness possibly through serotonergic mechanisms (86). Further support for the involvement of serotonergic neurotransmission comes from Sher et al's (2007) (87) study that showed lower CSF 5-HIAA levels in high-lethality attempters compared to low-lethality suicide attempters with comorbid alcoholism. However, they did not find difference in CSF homovanillic acid (HVA) or 3-methoxy-4-hydroxyphenylglycol (MHPG) levels.

Post-traumatic stress disorder (PTSD) merits specific attention because of being a well-defined anxiety disorder related to stress that has been associated to suicide risk after controlling for other relevant conditions such as depression and substance use disorders (88). This disorder shows an association with HPA axis dysfunction which is different to the one showed for depression (89). Instead of hypercortisolism, Yehuda et al. (2000) (90) showed hypocortisolism to be associated with increased risk for the development of PTSD. The same group later studied the patterns of basal cortisol secretion in offspring of Holocaust survivors with and without parental PTSD. Offspring with parental PTSD presented hypocortisolism in comparison with offspring without parental PTSD and children of nonexposed parents. Since this seemed to be due to maternal PTSD, the authors hypothesized a possible glucocorticoid programming either from in utero exposures or in response to maternal behaviors early in life (91).

Psychotic disorders may also share some of these mechanisms since psychotic episodes seem to promote suicide risk (92) but biological data approaching this issue are lacking to the best of our knowledge. From a different point of view, Brenner et al. (93) have studied the response to stress in 30 chronic schizophrenia patients and 30 controls to demonstrate that both groups physiologically react to stress but patients show hypocortisolism (smaller acute cortisol reaction to stress).

Personality disorders increase the risk of suicide behavior because Axis II is associated with more adverse events and Personality disorders diminish the stress coping. It could be hypothesized whether suicide risk may arise from interactions between specific personality profiles and life events to which people with the predisposing personality profile are particularly vulnerable.

LIMITATIONS AND IDEAS FOR THE FUTURE

Stress includes a wide array of concepts when it is applied to psychiatric conditions. Thus, more specific definitions of the stress syndrome are required to be applied in the research field. This first step should be followed by a demonstration of the specific changes in brain functioning induced by suicidality, stress phenomena and clinical disorders (94). Further difficulties come from the field of psychiatric nosology where described disorders are consensual typologies without straightforward correlations with natural phenomena.

In this setting, analysing the relationship between stress and suicide is a complex task. The stress-diathesis model provides us with a useful framework for the developing of predictive models, mostly presented by Mann and his collaborators in Columbia University. Serotonergic dysfunction (CSF 5-HIAA) is proposed as a marker of the presence of the diathesis, and HPA axis dysfunction (DST) as a marker of acute stress response. Results so far are modest and further efforts are needed to identify and refine biological tests (23). For instance, Galfavy et al. (2008) (95) compared the performance of prognostic models of increasing complexity for prediction of future suicide attempt and demonstrated that theoretical models were less powerful than data-driven selection techniques. This clearly indicates our yet poor understanding of the underpinnings of suicide. A better understanding of resilience mechanisms may help to empower our theoretical models. A neurobiological framework for protective factors, including biological mechanisms related to neural plasticity, will be necessary to improve our understanding of why some people develop psychopathological states as suicide while others remain free of such disorders (96).

CONCLUSIONS

Stress is a key factor for understanding suicide. A stress-diathesis model was presented in the nineties and is still today the better framework to approach suicide both in clinical and research settings. This model is based on several components that interact in a life-long process that may finally end in suicide. Life events and mental disorders act as stressors at different life stages. Childhood adverse experiences and suffering from a mental disorder seem to be particularly related to suicide. Phenotypic interactions with environmental factors also involve biological underpinnings, particularly the stress (HPA axis) and serotonergic systems, in a yet not completely understood way.

REFERENCES

[1] Blumenthal SJ: Suicide: a guide to risk factors, assessment, and treatment of suicidal patients. *Med Clin North Am 1*988; 72: 937-971.

[2] Mann JJ, Arango V: Integration of neurobiology and psychopathology in a unified model of suicidal behavior. *J Clin Psychopharmacol* 1992; 12(suppl 2): 2S-7S.

[3] Mościcki EK: Epidemiology of suicidal behavior. *Suicide Life Threat Behav* 1995; 25: 22-35.

[4] Mann JJ, Waternaux C, Haas GL, Malone KM: Towards a clinical model of suicidal behavior in psychiatric patients. *Am J Psychiatry* 1999; 156: 181-189.
[5] Baca-García E, Oquendo MA, Saiz-Ruiz J, Mann JJ, de Leon J: A pilot study on differences in aggression in New York City and Madrid, Spain, and their possible impact on suicidal behavior. *J Clin Psychiatry* 2006; 67: 375-380.
[6] Wasserman D: *A stress-vulnerability model and the development of the suicidal process*. Edited by Wasserman D. London, Martin Dunitz, 2001, pp 13-27.
[7] Goldstein DS, Kopin IJ: Evolution of concepts of stress. *Stress* 2007; 10: 109-120.
[8] McEwen B: Protective and damaging effects of stress mediators: central role of the brain. *Dialogues Clin Neurosci* 2006; 8: 367-381.
[9] Mann JJ, Arango V: *Neurobiology of suicide and attempted suicide*. Edited by Wasserman D. London, Martin Dunitz, 2001, pp 29-34.
[10] Åsberg M, Träskman L, Thorén P: 5-HIAA in the cerebrospinal fluid: a biological suicide predictor? Arch Gen Psychiatry 1976; 33: 1193-1197.
[11] Lester D: The concentration of neurotransmitter metabolites in the cerebrospinal fluid of suicidal individuals: a meta-analysis. *Pharmacopsychiatry* 1995; 28: 77-79.
[12] Samuelsson M, Jokinen J, Nordstrom AL, Nordstrom P: CSF 5-HIAA, suicide intent and hopelessness in the prediction of early suicide in male high-risk suicide attempters. *Acta Psychiatr Scand* 2006; 113: 44-47.
[13] Arango V, Underwood MD, Gubbi AV, Mann JJ: Localized alterations in pre-and postsynaptic serotonin binding sites in the ventrolateral prefrontal cortex of suicide victims. *Brain Res* 1995; 688: 121-133.
[14] Ono H, Shirakawa O, Kitamura N, Hashimoto T, Nishiguchi N, Nishimura A, Nushida H, Ueno Y, Maeda K: Tryptophan hydroxylase immunoreactivity is altered by the genetic variation in postmortem brain samples of both suicide victims and controls. *Mol Psychiatry* 2002; 7: 1127-1132.
[15] Oquendo MA, Russo SA, Underwood MD, Kassir SA, Ellis SP, Mann JJ, Arango V: Higher postmortem prefrontal 5-HT_{2A} receptor binding correlates with lifetime aggression in suicide. *Biol Psychiatry* 2006; 59: 235-243.
[16] Mann JJ: The neurobiology of suicide. *Nat Med* 1998; 4: 25-30.
[17] Mann JJ, Brent DA, Arango V: The neurobiology and genetics of suicide and attempted suicide: a focus on the serotonergic system. *Neuropsychopharmacology* 2001; 24: 467-477.
[18] Bunney WE JR, Fawcett JA: Possibility of a biochemical test for suicidal potential: an analysis of endocrine findings prior to three suicides. *Arch Gen Psychiatry* 1965; 13: 232-239.
[19] Westrin A, Ekman R, Träskman-Bendz L: Alterations of corticotropin releasing hormone (CRH) and neuropeptide Y (NPY) plasma levels in mood disorder patients with a recent suicide attempt. *Eur Neuropsychopharmacol* 1999; 9: 205-211.
[20] Westrin A, Niméus A: The dexamethasone suppression test and CSF-5-HIAA in relation to suicidality and depression in suicide attempters. *Eur Psychiatry* 2003; 18: 166-171.
[21] Yerevanian BI, Feusner JD, Koek RJ, Mintz J: The dexamethasone suppression test as a predictor of suicidal behavior in unipolar depression. *J Affect Disord* 2004; 83: 103-108.

[22] Coryell W, Young E, Carroll B: Hyperactivity of the hypothalamic-pituitary-adrenal axis and mortality in major depressive disorder. *Psychiatry Res* 2006; 142: 99-104.
[23] Mann JJ, Currier D, Stanley B, Oquendo MA, Amsel LV, Ellis SP: Can biological tests assist prediction of suicide in mood disorders?. *Int J Neuropsychopharmacol* 2006; 9: 465-474.
[24] Nemeroff CB, Owens MJ, Bissette G, Andorn AC, Stanley M: Reduced corticotropin releasing factor binding sites in the front cortex of suicidal victims. *Arch Gen Psychiatry* 1988; 45: 577-579.
[25] Mathew SJ, Coplan JD, Goetz RR, Feder A, Greenwald S, Dahl RE, Ryan ND, Mann JJ, Weissman MM: Differentiating depressed adolescent 24 h cortisol secretion in light of their adult clinical outcome. *Neuropsychopharmacology* 2003; 28: 1336-1343.
[26] Cleare AJ, Murray RM, O'Keane V: Reduced prolactin and cortisol responses to d-fenfluramine in depressed compared to healthy matched control subjects. *Neuropsychopharmacology* 1996; 14: 349-354.
[27] Malone KM, Corbitt EM, Li S, Mann JJ: Prolactin response to fenfluramine and suicide attempt lethality in major depression. *Br J Psychiatry* 1996; 168: 324-329.
[28] Brunner J, Stalla GK, Stalla J, Uhr M, Grabner A, Wetter TC, Bronisch T: Decreased corticotropin-releasing hormone (CRH) concentrations in the cerebrospinal fluid of eucortisolemic suicide attempters. *J Psychiatr Res* 2001; 35: 1-9.
[29] Lindqvist D, Isaksson A, Träskman-Bendz L, Brundin L: Salivary cortisol and suicidal behaviour - a follow-up study. *Psychoneuroendocrinology* 2008; 33: 1061-1068.
[30] Westrin A, Ekman R, Regnell G, Traskman-Bendz L: A follow up study of suicide attempters: increase of CSF-somatostatin but no change in CSF-CRH. Eur *Neuropsychopharmacol* 2001; 11: 135-143.
[31] Lindqvist D, Traskman-Bendz L, Vang F: Suicidal intent and the HPA-axis characteristics of suicide attempters with major depressive disorder and adjustment disorders. *Arch Suicide Res* 2008; 12: 197-207.
[32] Pfenning A, Kunzel HE, Kern N, Ising M, Majer M, Fuchs B, Ernst G, Holsboer F, Binder EB: Hypothalamus–pituitary–adrenal system regulation and suicidal behavior in depression. *Biol Psychiatry* 2005; 57: 336-342.
[33] Fries E, Hesse J, Hellhammer J, Hellhammer DH: A new view on hypocortisolism. *Psychoneuroendocrinology* 2005; 30: 1010-1016.
[34] Swaab DF, Bao AM, Lucassen PJ: The stress system in the human brain in depression and neurodegeneration. *Ageing Res Rev* 2005; 4: 141-194.
[35] Brundin L, Bjorkqvist M, Petersén A, Traskman-Bendz L: Reduced orexin levels in the cerebrospinal fluid of suicidal patients with major depressive disorder. *Eur Neuropsychopharmacol* 2007; 17: 573-579.
[36] Brundin L, Björkqvist M, Träskman-Bendz L, Petersén A: Increased orexin levels in the cerebrospinal fluid the first year after a suicide attempt. *Journal of Affective Disorders* 2009; 113: 179-182.
[37] Currier D, Mann JJ: Stress, genes and the biology of suicidal behavior. *Psychiatr Clin North Am* 2008; 31: 247-269.
[38] Chaouloff F: Serotonin, stress and corticoids. J Psychopharmacol 2000; 14: 139-151.
[39] Leonard BE: The HPA and immune axes in stress: the involvement of serotonergic system. *Eur Psychiatry* 2005; 20: S302-S306.

[40] Jokinen J, Mårtensson B, Nordström AL, Nordström P: CSF 5-HIAA and DST non-suppression -independent biomarkers in suicide attempters?. *J Affect Disord* 2008; 105: 241-245.
[41] Firk C, Markus CR: Review: Serotonin by stress interaction: a susceptibility factor for the development of depression?. *J Psychopharmacol* 2007; 21: 538-544.
[42] Audenaert K, Peremans K, Goethals I, van Heeringen C: Functional imaging, serotonin and the suicidal brain. *Acta Neurol Belg* 2006; 106: 125-131.
[43] Kim J: Serotonin, stress and conditioning. *Biol Psychiatry* 2008; 63: 819-820.
[44] Monkul ES, Hatch JP, Nicoletti MA, Spence S, Brambilla P, Lacerda AL, Sassi RB, Mallinger AG, Keshavan MS, Soares JC: Fronto-limbic brain structures in suicidal and non-suicidal female patients with major depressive disorder. *Mol Psychiatry* 2007; 12: 360-366.
[45] Aguilar EJ, García-Martí G, Martí-Bonmatí L, Lull JJ, Moratal D, Escartí MJ, Robles M, González JC, Guillamón MI, Sanjuán J: Left orbitofrontal and superior temporal gyrus structural changes associated to suicidal behavior in patients with schizophrenia. *Prog Neuropsychopharmacol Biol Psychiatry* 2008; 32: 1673-1676.
[46] Rüsch N, Spoletini I, Wilke M, Martinotti G, Bria P, Trequattrini A, Bonaviri G, Caltagirone C, Spalletta G: Inferior frontal white matter volume and suicidality in schizophrenia. *Psychiatry Res* 2008; 164: 206-214.
[47] Brent DA, Mann JJ: Family genetic studies, suicide, and suicidal behavior. *Am J Med Genet C Semin Med Genet* 2005; 133C: 13-24.
[48] Statham DJ, Heath AC, Madden PA, Bucholz KK, Bierut L, Dinwiddie SH, Slutske WS, Dunne MP, Martin NG: Suicidal behaviour: an epidemiological and genetic study. *Psychol Med* 1998; 28: 839-855.
[49] Fu Q, Heath AC, Bucholz KK, Nelson EC, Glowinski AL, Goldberg J, Lyons MJ, Tsuang MT, Jacob T, True MR, Eisen SA: A twin study of genetic and environmental influences on suicidality in men. *Psychol Med* 2002; 32: 11-24.
[50] Bellivier F, Chaste P, Malafosse A: Association between the TPH gene A218C polymorphism and suicidal behavior: a meta-analysis. *Am J Med Genet B Neuropsychiatr Genet* 2004; 124B: 87-91.
[51] Lin PY, Tsai G: Association between serotonin transporter gene promoter polymorphism and suicide: results of a meta-analysis. *Biol Psychiatry* 2004; 55: 1023-1030.
[52] Li D, He L: Further clarification of the contribution of the tryptophan hydroxylase (TPH) gene to suicidal behavior using systematic allelic and genotypic meta-analyses. *Hum Genet* 2006; 119: 233-240.
[53] Li D, He L: Meta-analysis supports association between serotonin transporter (5-HTT) and suicidal behavior. *Mol Psychiatry* 2007; 12: 47-54.
[54] Caspi A, Sugden K, Moffitt TE, Taylor A, Craig IW, Harrington H, McClay J, Mill J, Martin J, Braithwaite A, Poulton R: Influence of life stress on depression: moderation by a polymorphism in the 5-HTT gene. *Science* 2003; 301: 386-389.
[55] Gibb BE, McGeary JE, Beevers CG, Miller IW: Serotonin transporter (5-HTTLPR) genotype, childhood abuse, and suicide attempts in adult psychiatric inpatients. *Suicide Life Threat Behav* 2006; 36: 687-693.

[56] Kia-Keating BM, Glatt SJ, Tsuang MT: Meta-analyses suggest association between COMT, but not HTR1B, alleles, and suicidal behavior. *Am J Med Genet B Neuropsychiatr Genet* 2007; 144B: 1048-1053.

[57] Mann JJ, Arango VA, Avenevoli S, Brent DA, Champagne FA, Clayton P, Currier D, Dougherty DM, Haghighi F, Hodge SE, Kleinman J, Lehner T, McMahon F, Mościcki EK, Oquendo MA, Pandey GN, Pearson J, Stanley B, Terwilliger J, Wenzel A: Candidate Endophenotypes for Genetic Studies of Suicidal Behavior. *Biol Psychiatry*. In press.

[58] Beautrais A: Suicide in New Zealand II: a review of risk factors and prevention. *The New Zealand Medical Journal* 2003; 116: U461.

[59] Enns MW, Cox BJ, Afifi TO, de Graaf R, ten Have M, Sareen J: Childhood adversities and risk for suicidal ideation and attempts: a longitudinal population-based study. *Psychol Med* 2006; 36: 1769-1778.

[60] Roy A: Relationship of childhood trauma to age of suicide attempt and number of attempts in substance dependent patients. *Acta Psychiatr Scand* 2004; 109: 121–125.

[61] Afifi TO, Enns MW, Cox BJ, Asmundson GJ, Stein MB, Sareen J: Population attributable fractions of psychiatric disorders and suicide ideation and attempts associated with adverse childhood experiences. *Am J Public Health* 2008; 98: 946-952.

[62] Pagura J, Cox BJ, Sareen J, Enns MW: Factors Associated With Multiple Versus Single Episode Suicide Attempts in the 1990–1992 and 2001–2003 United States National Comorbidity Surveys. *J Nerv Ment Dis* 2008; 196: 806-813.

[63] Brezo J, Paris J, Barker ED, Tremblay R, Vitaro F, Zoccolillo M, Hébert M, Turecki G: Natural history of suicidal behaviors in a population-based sample of young adults. *Psychol Med* 2007; 37: 1563-1574.

[64] Fergusson DM, Woodward LJ, Horwood LJ: Risk factors and life processes associated with the onset of suicidal behaviour during adolescence and early adulthood. *Psychol Med* 2000; 30: 23-39.

[65] McEwen BS: Allostasis and allostatic load: implications for neuropsychopharmacology. *Neuropsychopharmacology* 2000; 22: 109-124.

[66] Fergusson DM, Beautrais AL, Horwood LJ: Vulnerability and resiliency to suicidal behaviours in young people. *Psychol Med* 2003; 33: 61-73.

[67] Brent DA, Oquendo M, Birmaher B, Greenhill L, Kolko D, Stanley B, Zelazny J, Brodsky B, Bridge J, Ellis S, Salazar JO, Mann JJ: Familial pathways to early-onset suicide attempt: risk for suicidal behavior in offspring of mood-disordered suicide attempters. *Arch Gen Psychiatry* 2002; 59: 801-807.

[68] Molnar BE, Berkman LF, Buka SL: Psychopathology, childhood sexual abuse and other childhood adversities: relative links to subsequent suicidal behaviour in the US. *Psychol Med* 2001; 31: 965-977.

[69] Nelson E, Health A, Madden P, Cooper L, Dinwiddle S, Bucholz K, Glowinski A, McLaughlin T, Dunne DM, Statham D, Martin N: Association between self-reported childhood sexual abuse and adverse psychosocial outcomes: Results from a twin study. *Arch Gen Psychiatry* 2002; 59: 139-145.

[70] Ystgaard M, Hestetun I, Loeb M, Mehlum L: Is there a specific relationship between childhood sexual and physical abuse and repeated suicidal behavior? *Child Abuse Neglect* 2004; 28: 863-875.

[71] Sunnqvist C, Westrin A, Träskman-Bendz L. Suicide attempters: biological stressmarkers and adverse life events. *Eur Arch Psychiatry Clin Neurosci* 2008; 258: 456-462.

[72] Heikkinen M, Aro H, Lonnqvist J: Recent life events, social support and suicide. *Acta Psychiatr Scand* 1994; suppl 89: 65-72.

[73] Belik SL, Cox BJ, Stein MB, Asmundson GJ, Sareen J: Traumatic events and suicidal behavior: results from a national mental health survey. *J Nerv Ment Dis* 2007; 195: 342-349.

[74] Harwood DM, Hawton K, Hope T, Harriss L, Jacoby R: Life problems and physical illness as risk factors for suicide in older people: a descriptive and case-control study. *Psychol Med* 2006; 36: 1265-1274.

[75] Kessler RC, Galea S, Gruber MJ, Sampson NA, Ursano RJ, Wessely S: Trends in mental illness and suicidality after Hurricane Katrina. *Mol Psychiatry* 2008; 13: 374-384.

[76] Ganzel BL, Kim P, Glover GH, Temple E: Resilience after 9/11: multimodal neuroimaging evidence for stress-related change in the healthy adult brain. *Neuroimage* 2008; 40: 788-795.

[77] Haw C, Hawton K: Life problems and deliberate self-harm: associations with gender, age, suicidal intent and psychiatric and personality disorder. *J Affect Disord* 2008; 109: 139-48.

[78] Coryell W, Schlesser M: The dexamethasone suppression test and suicide prediction. *Am J Psychiatry* 2001; 158: 748-753.

[79] Coryell W, Schlesser: Combined biological tests for suicide prediction. *Psychiatry Res* 2007; 150: 187-191.

[80] Jokinen J, Nordström P: HPA axis hyperactivity and attempted suicide in young adult mood disorder inpatients. *J Affect Disord.* In press.

[81] Baca-Garcia E, Parra CP, Perez-Rodriguez MM, Diaz Sastre C, Torres RR, Saiz-Ruiz J, de Leon J: Psychosocial stressors may be strongly associated with suicide attempts. *Stress and Health* 2007; 23: 191-198.

[82] Westrin A, Frii K, Träskman-Bendz L: The dexamethasone suppression test and DSM-III-R diagnoses in suicide attempters. *Eur Psychiatry* 2003; 18: 350-355.

[83] Öjehagen A, Johnsson E, Träskman-Bendz L: The longterm stability of temperament traits measured after a suicide attempt. A 5-year follow-up of ratings of Karolinska scales of personality (KSP). *Nord J Psychiatry* 2003; 57: 125-130.

[84] Hawgood J, De Leo D: Anxiety disorders and suicidal behaviour: an update. Anxiety disorders and suicidal behaviour: an update. *Curr Opin Psychiatry* 2008; 21: 51-64.

[85] Sher L: Alcoholism and suicidal behavior: a clinical overview. *Acta Psychiatr Scand* 2006; 113: 13-22.

[86] Brady J: The association between alcohol misuse and suicidal behaviour. *Alcohol Alcohol* 2006; 41: 473-478.

[87] Sher L, Oquendo MA, Grunebaum MF, Burke AK, Huang YY, Mann JJ: CSF monoamine metabolites and lethality of suicide attempts in depressed patients with alcohol dependence. *Eur Neuropsychopharmacol* 2007; 17: 12-15.

[88] Waldrop AE, Hanson RF, Resnick HS, Kilpatrick DG, Naugle AE, Saunders BE: Risk factors for suicidal behavior among a national sample of adolescents: implications for prevention. *J Trauma Stress* 2007; 20: 869-879.

[89] Mann JJ: Neurobiology of suicidal behaviour. *Nat Rev Neurosci* 2003; 4: 819-828.
[90] Yehuda R, Bierer LM, Schmeidler J, Aferiat DH, Breslau I, Dolan S: Low cortisol and risk for PTSD in adult offspring of holocaust survivors. *Am J Psychiatry* 2000; 157: 1252-1259.
[91] Yehuda R, Teicher MH, Seckl JR, Grossman RA, Morris A, Bierer LM: Parental posttraumatic stress disorder as a vulnerability factor for low cortisol trait in offspring of holocaust survivors. *Arch Gen Psychiatry* 2007; 64: 1040-1048.
[92] Tarrier N, Khan S, Cater J, Picken A: The subjective consequences of suffering a first episode psychosis: trauma and suicide behaviour. *Soc Psychiatry Psychiatr Epidemiol* 2007; 42: 29-35.
[93] Brenner K, Liu A, Laplante DP, Lupien S, Pruessner JC, Ciampi A, Joober R, King S: Cortisol response to a psychosocial stressor in schizophrenia: Blunted, delayed, or normal?. *Psychoneuroendocrinology*. In press.
[94] van Praag HM: Stress and suicide are we well-equipped to study this issue?. *Crisis* 2004; 25: 80-85.
[95] Galfalvy HC, Oquendo MA, Mann JJ: Evaluation of clinical prognostic models for suicide attempts after a major depressive episode. *Acta Psychiatr Scand* 2008; 117: 244-252.
[96] Cicchetti D, Blender JA: A multiple-levels-of-analysis perspective on resilience: implications for the developing brain, neural plasticity, and preventive interventions. *Ann N Y Acad Sci* 2006; 1094: 248-258.

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 9

POST TRAUMATIC STRESS DISORDER AND SUICIDAL BEHAVIOR

Maurizio Pompili, Alberto Forte, Enrica De Simoni, Ludovica Telesforo, David Lester, Roberto Tatarelli and Stefano Ferracuti

Sant'Andrea Hospital, Rome, Italy; Sapienza University of Rome, Rome, Italy;
Harvard Medical School, Boston, Massachusetts, USA;
The Richard Stockton College of New Jersey, Pomona, New Jersey, USA

ABSTRACT

Much evidence has shown that PTSD is significantly associated with suicidal ideation and suicide attempts. Suicide is an important cause of death in veterans, and the risk for intentional death continues to be high many years after service. Specific PTSD symptoms and specific psychological conditions associated with chronic stress reactions may contribute or mediate the association between PTSD and suicidal behavior. Furthermore, patients with PTSD often have comorbid disorders that may lead to a further increase of risk of suicide in these patients. Research has demonstrated that the magnitude of guilt, cluster B symptoms and comorbid depression were associated with increased suicide risk in PTSD Veterans. For the first time since the Vietnam War, the suicide rate in the military is higher than that in the general population, and so preventive strategies are extremely important to reduce suicide risk in deployed troops.

INTRODUCTION

Post traumatic stress disorder (PTSD) is a syndrome that was first assessed and studied as a result of observations of soldiers returning from war. The condition has long been recognized in clinical psychiatry, although official recognition arrived only with the publication of the DSM-III in 1980 in which PTDS was officially admitted as diagnostic

category (1). A condition similar to PTSD has been observed, and was named "irritable heart" because of its autonomic symptoms, since the American Civil War.

After the two World Wars in the 20th Century, there was an increased focus on the psychiatric health of veterans, in particular, a syndrome characterized by tremors, recurring nightmares, difficulty in concentration, amnesia and loss of sexual desire, all related to the experience of war. After the Vietnam War and the return of a very large population of traumatized veterans, the study of this syndrome that had previously been called "war neurosis," "battle fatigue," "combat stress reactions," "shell shock" and "soldier's heart," took off and resulted in the new term "*post-traumatic stress disorder."*

The initial DSM-III formulation emphasized traumatic events, exceptional stressors that were "outside the range of usual human experience," such as war, torture, rape, the Holocaust and disasters. The fourth edition of the DSM and its revision redefined trauma. A trauma was defined as any event directly or indirectly experienced "that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others." Unlike the previous definition, there was a second fundamental criterion to be satisfied: the person had to react to the experience with "intense fear, helplessness or horror" (2). In this new view, stressful events, although necessary, were not, sufficient to cause the disorder, and its extreme intensity was not a limiting factor. Furthermore, the subjective response of individuals to the trauma acquired a new importance, introducing the idea that individual connotations may or may not lead to the clinical confirmation of disease.

The characteristic symptoms resulting from exposure to trauma were re-experiencing the traumatic event, avoiding stimuli associated with the trauma, including efforts to avoid thoughts or activities related to the trauma, reduced capacity to remember events related to the trauma, blunted affect, feelings of detachment from others, a sense of a foreshortened future, and experiencing symptoms of increased autonomic arousal, such as irritability, insomnia, difficulty concentrating, hypervigilance, exaggerated startle and outbursts of anger (2). Flashbacks represent the classic form of re-experiencing. The individual may act and feel as if the trauma were re-occurring. Other forms of re-experiencing included distressing recollections or dreams. Re-experiencing manifestations may also occur during delusions, hallucinations or dissociative episodes (3).

Another typical symptom of PTSD is numbing, an avoidance cluster of symptoms that reflects difficulty in focusing on positive affect. Emotional numbing consists of lack of interest in activities, detachment from others, and a restricted range of emotional expressiveness (4). Related symptoms often include social isolation, a restricted range of emotion, and absence of intimacy in relationships. There are also frequent feelings such as pain, helplessness, sadness, guilt, fear, shame and intense anger, and an increased risk of developing secondary comorbid disorders such as depressions and anxiety disorders. Drugs or alcohol abuse may present another complicating factor. Chronic forms of PTSD are associated with social disability, such as work impairment, difficult settling into domestic life, divorce, and a reduction or worsening in social contacts (5).

Regarding the course of the psychological reactions to trauma, many individuals, prior to developing PTSD, may develop acute stress reactions, although not all individuals with acute stress syndromes developed PTSD. *Chronic PTSD* refers to an episode lasting 3 months or longer, the beginning of which can occur years after exposure to the trauma (6). *PTSD with delayed onset* refers to an episode that develops 6 months or more after exposure to the traumatic event (3). Combat veterans seem to be particularly susceptible to having delayed-

onset PTSD (7,8). Retrospective research has shown that PTSD in veterans typically follows a chronic course. This tendency to become chronic seems be higher in veterans than in civilians. PTSD is a disorder that may persist for decades and sometimes for a lifetime (9).

In veterans, risk factors for PTSD are clustered into three categories. First are the prewar factors, such as enrolled in the military at a young age, low levels of education, childhood and adolescent behavioral problems or personality traits (peak scores on the Pd and Mf scales on the MMPI), childhood physical abuse (10), a deprived childhood, and a family history of psychiatric disorders. Variables associated with combat include physical assault (sexual assault, if female), deployment in areas with high combat density, injury, exposure to atrocities, and imprisonment. Postwar factors include lack of social support (11) and social withdrawal (12). Regarding war-related PTSD, the majority of epidemiological studies have been conducted on Vietnam veterans. In these samples, the lifetime prevalence of PTSD has been estimated to be more than 15% (13) versus 2.5% for the non-Vietnam veterans, but 35.8% for veterans who fought in areas of high combat exposure. The risk of developing PTSD has been shown to vary according to the type of trauma and to the magnitude and number of exposures.

PTSD is unique among psychiatric diagnoses because of the great importance placed upon the etiological agent, the traumatic stressor. (The adjustment disorders [AD] are similar in some ways to PTSD, but the difference is in the stressor. In both cases, a trauma may be the origin of the psychiatric disturbance, but it is the degree which makes the difference. This similarity must be taken in account since there is ample evidence that an adjustment reaction may increase the risk of suicide. It is not known whether PTSD increases the risk more than AD does.). There are several elements of traumatic events that seem to have a particular psychological significance and can increase the risk for PTSD and its consequences. These included the classical dimensions of stressors: threat to one's life and bodily integrity, severe physical harm or injury, witnessing or learning of violence or severe harm to others, causing the death or severe harm to another, and exposure to the grotesque (14). All these stressors are frequently present in war zones. Secondly, for several types of traumatic events, there seems to be a positive-dose response relationship relating the capacity of stressor to increase the risk to developing PTSD and also the susceptibility to suicidal behavior (15).

Exposure to combat operations has been found to be an important predictor for both PTSD severity and suicidal attempts. The prevalence of PTSD increases linearly with the number of firefights during deployment. For example, rates for PTSD among 894 soldiers who had been deployed to Iraq was found to be 4.5% for no fights, 9.3% for one to two firefights, 12.7 % for three to five firefights, and 19.3% for more than five firefights (16). Suicidal behavior has also been observed to be particularly frequent among PTSD veterans with combat experience. Exposure to atrocities during combat is a very strong predictor of the development of PTSD and suicidal ideation (17). In a sample of 8,441 active soldiers, engagement in combat operations and witnessing atrocities were associated with an increased prevalence of mental disorders (including PTSD) and suicidal risk. The intensity of the subjective response of fear, helplessness and horror to a trauma after a combat related event was related to a high PTSD checklist score and a greater number of PTSD symptoms (18).

Research has shown that PTSD is significantly associated with suicidal ideation and suicide attempts. Analysis of data from the National Comorbidity Survey (19) demonstrated that the lifetime incidence of suicidality (suicide attempts and ideation) in PTSD patients was second only to the risk of suicide in depressed individuals (20).

Suicide is an important cause of death in veterans, and the risk for intentional death continues to be high many years after service. Price et al. (9), investigating suicidal behavior up to 25 years after deployment, demonstrated that the rate of suicidality in veterans increased monotonically from first years of observation (1971) until around 1985, after which it reached a plateau and hovered between 7% and 8% until 1996, when they ended their research. Clinical research indicates that this long-standing vulnerability for suicidal behavior in veterans may be a typical consequence of traumatic experiences. In fact, the estimated overall mortality among veterans with PTSD was 71% higher than veterans without PTSD (21). This increase in mortality consisted primarily of death by motor vehicle accidents and suicide. Drescher and colleagues (22) studied the specific-cause of mortality among 1,866 male veterans treated for PTSD between 1990 and 1998. Fourteen percent of the deaths were due to intentional death, more than triple that found in the general population adjusted for age and race. Thirty percent of all deaths occurred because of accidents (9.2% were motor vehicle accidents and 1.8% were overdoses), approximately five times that of the control sample. The data on suicide could be an underestimate because some of the accidental and undetermined deaths could have been suicides.

Research suggests also that specific PTSD symptoms and specific psychological conditions associated with chronic stress reactions may contribute or mediate the association between PTSD and suicidal behavior. Furthermore, patients with PTSD often have comorbid disorders and other conditions, such as feelings of sadness, guilt and loss of perspective, that may lead to a further increase of risk of suicide in these patients.

The following discussion will examine some of these elements and their role in suicidal behavior in patients with current PTSD.

MATERIALS AND METHODS

We performed a careful MedLine, Excerpta Medica, PsycLit and PsycInfo search for the period 1980 to 2008. The following search terms were used: “Suicid*” (which comprises suicide, suicidal, suicidality, and other suicide-related terms), “Post-Traumatic Stress Disorder” or “PTSD” and “War” or “Veterans.” Textbooks on psychiatry were also consulted.

The selection of papers suitable for this review allowed the inclusion only of those articles published in English peer-reviewed journals, including studies that added an original contribution to the literature. A total of 253 articles were located through our search, and the most relevant articles were selected for this review. We identified some specific fields of interest in the analysis of war-related PTSD and suicidal behavior. We excluded studies that mentioned data about suicide but were not clear about follow-up times, the method of statistical analysis, diagnostic criteria or the number of patients studied.

RESULTS

Association between PTSD and Suicide

PTSD is associated with significant morbidity and mortality and increases the risk for suicidal behavior as much as 14-fold (23,5). Some studies demonstrated that having a history of PTSD or exposure to traumatic stressors is associated with higher rates of morbidity (24, 25). There are also reports that have suggested that military personnel may be at higher risk for suicide after their return (26). Some research has demonstrated that high-risk behaviors, such as suicide attempts, violence and substance use, persist among veterans with PTSD even after treatment (27). Other research indicates that veterans with PTSD have higher rates of interpersonal violence compared with veterans without PTSD (28).

Several studies indicate a strong association between PTSD and suicidal behavior (29,30, 31), while others do not find an association between combat-related PTSD and suicidal behavior (32,33,34). Sareen et al. (20) used a multivariate analysis to identify an association between anxiety disorders and suicidal behavior using a nationally representative survey and found that PTSD was the only anxiety disorder that was independently associated with suicidal ideation and suicide attempts. Moreover they found that this association was strong even after controlling for effects of several known covariates, including the presence of high levels of comorbidity. This study demonstrated, using a nationally representative sample, that the positive relationship between PTSD and suicidal behavior is not due to comorbid depression as previously reported by Kramer et al. (35) who reported that suicidal ideation or behavior is more frequent if the individual has been diagnosed with PTSD and depression or dysthymia.

In 1990, an interesting study examined potential risk factors for suicide among Vietnam veterans, using Vietnam veterans who died from motor vehicle accidents as a comparison group (36). They found that the only significant difference between the two groups was that the suicides seemed to have experienced more PTSD-related symptoms than the comparison group. The two groups did not differ in demographic risk factors or military risk factors and, in most respects, the psychological profile was similar for the two groups of veterans.

Some years later, another study reported that, among Vietnam veterans, PTSD was associated with a significantly increased risk for suicide and accidental poisoning (21). In this research, two groups were compared, a study group which consisted of veterans with PTSD and a control group of veterans without PTSD. PTSD was associated with a statistically significant increased risk for suicide and accidental poisoning. When compared with the U.S. general population, both groups showed an increased risk for all external causes of death. PTSD was associated with a sevenfold increased risk for suicide, compared with a 1.7-fold increased risk for suicide observed among the non-PTSD group (21). The risk for all accidental deaths and motor vehicle deaths among PTSD veterans was twice that for non-PTSD subjects when both groups were compared with the general U.S. population.

In the Vietnam Experience Study (VES) of 18,313 male US Army veterans from the end of their military service through December 31, 2000 (37), all-cause mortality appeared to be higher among Vietnam theater veterans as compared with Vietnam-era veterans who served elsewhere. Death rates from disease-related chronic conditions did not appear to differ between the two groups of veterans, despite the increasing age of the cohort and the long 30-

year follow-up period. However, the investigators reported that the rate of death from external causes, which included homicide, suicide, accidental poisoning and unintended injury, was higher among theater veterans in the first 5 years after active duty.

A study of Marine Corps Vietnam veterans followed 22,062 veterans from discharge from active duty through 1991 and found an excess of all-cause mortality among Vietnam theater veterans. This appeared to be due to external causes of death which included suicide (38). A study of a national sample of 15,288 Vietnam veterans reported the most convincing evidence linking PTSD to external mortality (39). Boscarino used Cox proportional hazard regressions to examine survival time and external cause of death 16 years after a telephone survey (about 30 years after military service). Results indicated that post-war mortality from external causes was associated with PTSD among Vietnam theater veterans (n = 7,924), with a hazard ratio (HR) of 2.3 (p = .001). It is interesting that deaths from other causes, such as cancer and cardiovascular diseases, were also elevated.

Another recent study examined the impact of PTSD on external mortality among Vietnam veterans by means of an assessment of post-service mortality among those in the VES cohort who completed telephone interviews conducted by Research Triangle Institute (RTI) (40). Boscarino's main hypothesis was that external mortality was principally due to PTSD and not to combat exposure per se or predisposing character traits. Participants were 17,867 U.S. army veterans known to be alive in December 1983. Starting in January 1985, these men were contacted in order to complete telephone interviews. The interview included questions related to PTSD symptoms, health status, substance abuse, combat exposure, demographic data and military history information. These men were identified through a random sample of 48,513 service records selected from the National Personnel Records Center. Of these, 18,581 veterans met the criteria for study eligibility. Participants were classified as Vietnam theater veterans if they served at least one tour of duty in Vietnam or as Vietnam-era veterans if they never served in Vietnam and if they served at least one tour of duty elsewhere. Vital status was assessed from the date of completion of the telephone interviews starting in January 1985 until the end of the mortality follow-up on December 31, 2000. Ascertainment of PTSD status was made comparing the results of the RTI-PTSD scale to those obtained by the Diagnostic Interview Schedule-Version III (DIS-III), based on the Diagnostic and Statistical Manual of Mental Disorders, Third Edition (DSM-III). The results showed that PTSD was associated with a higher adjusted all-cause mortality for both non-theater and theater veterans. However, for external-cause mortality, PTSD-positive theater veterans appeared to have an increased risk of death. Specific cause-of-death classifications suggested that Vietnam-theater veterans were more likely to die of suicide, homicide, and alcohol and drug-related causes. Boscarino concluded that, although the etiology of external-cause mortality among veterans appeared to be multifactorial and that PTSD was a major factor in this outcome, predisposing factors likely related to character traits also appeared to be associated with this outcome and apparently varied by veteran status. This study suggested that, although there seems to be predisposing factors that may increase or decrease the risk of external-cause mortality among veterans, it is PTSD and not past combat exposure, that is associated with this outcome.

FACTORS ASSOCIATED WITH SUICIDAL BEHAVIOR IN PTSD

Re-Experiencing Symptoms

As we have seen, re-experiencing symptoms is a diagnostic criterion for PTSD, and the traumatic event may be re-experienced in many ways. Often individuals have recurrent and intrusive memories, sensations or emotions that are associated with the traumatic event, and uncomfortable dreams during which the event is represented. Less frequent are flashbacks and/or dissociation. During flashbacks, a person may feel or act as if the traumatic event was happening again. A flashback generally is a temporary occurrence, and a person may maintain some connection with the present moment. On the other hand, during a flashback, a person may have an authentic dissociative episode and lose all awareness of what is going on around him. Re-experiencing may also occur during delusions and hallucinations and other psychotic reactions. During flashbacks, dissociative or psychotic states, the individual may engage in impulsive, aggressive and self-destructive behavior, including suicidal acts (41).

The possibility that cluster-B symptoms, and the considerable distress produced by them, is associated with a higher risk of suicidal behavior and ideation was confirmed in a recent study conducted on veterans diagnosed for chronic PTSD (42). Nye found a strong association between re-experiencing and suicidal ideation with cluster-B symptoms but not symptoms of the other two clusters. Nye also found a significant association between cluster-B symptoms and exposure to atrocities.

Guilt

Guilt is an important feeling associated with PTSD. It may also be a mechanism that underlies the relationship between PTSD and suicidality. There is evidence that this emotional consequence of trauma may increase the risk and also the strength of suicidal ideation in patients with PTSD. Guilt is typically of two forms: combat guilt and survivor guilt.

The first seems to play an important role in the development and maintenance of PTSD. It generally concerns the sense of responsibility for combat actions, such as killing the enemy or failing to prevent the death of others, and its severity is positively correlated with the re-experiencing and avoidance symptoms of PTSD and with global PTSD severity (32). Survivor guilt occurs when a person perceives himself to be responsible for the death of close friends killed in combat.

The presence and intensity of persistent guilt associated with war is directly related to suicidality in veterans. A special link seems to be combat guilt. Hendin and Haas (32) evaluated the relationship between suicide and the two types of guilt in a sample of 100 Vietnam combat veterans with a diagnosis of PTSD. Compared to nonsuicidal veterans, the suicidal veterans were more likely to report guilt. Thirty-five had attempted suicide at least once since returning from Vietnam and were constantly preoccupied with suicide for a considerable part of their lives after deployment. Combat-related guilt, usually related to having inadvertently or deliberately killed civilians, was found to be the strongest predictor of suicidal behavior. The likelihood of developing combat-related guilt was related to feeling out

of control because of experiencing terror or rage when they committed the acts. Survivor guilt was another but less significant predictor. Feelings of combat-related guilt were found in 100% of suicide attempters but in only 48.5% of nonsuicidal veterans. Survivor guilt was found in 73.7% of the suicide attempters and 36.4% of nonsuicidal veterans. Depression, although it was also positively related to suicide attempts, had a minor role compared to guilt as a predictor of suicidality.

Comorbidity

The scientific literature consistently documents the frequent co-morbidity between PTSD and other psychiatric disorders. Secondary depression, substance abuse and personality disorders are the most frequent disorders found with PTSD (43). In a sample of 3,016 veterans, Kulka et al. found that the prevalence of PTSD was 15%, and 99% of the veterans with PTSD met the criteria for another disorder: 26% for lifetime major depressive episode, 21% for dysthymia, and 31% for personality disorder. Hankin (44) found that, among the 426 veterans (20% of the total sample) who met the criteria for PTSD, 82% (n=348) met the screening criteria for depression and 24% (n=104) for an alcohol-related disorder.

The risk of suicidal ideation in clinical samples of depressed versus depressed+comorbid PTSD veterans is greater in the latter group of patients (45,46,47). Research on the possibility that PTSD comorbid with depression, as compared with PTSD alone, has a cumulative effect in enhancing the risk for suicidal acts or behavior produces inconsistent results. Several researchers report that veterans with dual diagnoses of PTSD and depression exhibit increased suicidal behavior compared to those with only PTSD (35,48,49,32), suggesting a cumulative effect exerted by the two disorders. In addition, patients with comorbidity have higher levels of impulsivity and hostility and higher levels of impairment in social functioning (50).

But other research does not support this conclusion. For example, no difference were found in reported suicidal behavior between the PTSD patients with and without depression in a study by Ferrada-Noli (51). However, there were twice the number of cases with a history of suicide attempt among the PTSD/non-depression group than in the PTSD/depression. On the other hand, the PTSD/depression group had an increased frequency of recurrent suicide thoughts in comparison with the PTSD/non-depression group.

Sareen and colleagues (20) argued that suicidal ideation in PTSD patients was not due to comorbid depression. Indeed, Zokaric-Kovacic (52) identified depression as a negative predictor of suicidality in PTSD veterans. Other research also suggests that veterans with comorbid depression and PTSD are at lower risk for suicide than depressed veterans without this comorbidity (53). Zivin et al. attributed this to the possibility that comorbid PTSD-depressed patients were receiving more psychotherapy or other mental health treatment than veterans without this comorbidity. Mood symptoms may amplify the global symptomatology of PTSD (including subthreshold PTSD), and this could lead to an early request for aid from the patients.

PREDICTIVE FACTORS FOR SUICIDE IN PTSD

Guilt is important as a predictor of suicide in veterans with PTSD. Research documents a clear relationship between veterans' combat-related guilt and post-service suicidal behavior. As we already mentioned above, Hendin and Haas (32), in a sample of 100 veterans with a diagnosis of PTSD, found that 19 had attempted suicide at least once since returning from Vietnam, 15 had been preoccupied with suicide and 66 had neither attempted nor been preoccupied with suicide. The presence of persistent guilt related to wartime experience provided the most relevant difference between the suicide attempters and the non-suicidal veterans. Two different kind of guilt were considered, and both played an important role in determining the vulnerability to suicide among the veterans suffering from PTSD: guilt about combat actions and guilt about surviving when others had died. Of the two kinds of guilt, combat-related guilt was found to be more strongly associated with suicidal behavior. An explanation for this finding comes from considering the nature of guerrilla combat in Vietnam. Veterans felt guilt about several types of combat action, such as the use of women and children as combatants and the uncertainty about who was the enemy (32). Survivor guilt was significantly related to post-service suicide attempts but not to suicidal preoccupation.

Another risk factor that has been investigated in Vietnam veterans is exposure to Agent Orange. Agent Orange is a herbicide which was sprayed extensively in Vietnam as a means of destroying cover and crops that could be used by opposing forces. The toxic component of this herbicide is 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). Levy (54)found that subjects exposed to TCDD in Vietnam, in contrast to a control group of Vietnam veterans who had not been exposed, showed organic psychological deficits and a higher rate of PTSD and its associated features - depression, anxiety and increased aggression (including violence against others and suicidal thoughts). All of the exposed subjects met the diagnostic criteria for PTSD and the three associated features mentioned above, in contrast to control group in which the rate of PTSD was 20% and the rate for the three associated features was only 8%.

Hartl et al. (55) tried to identify PTSD patients at high risk for negative behavioral outcomes (violence, suicide attempts, and substance use). Their sample consisted of 630 male veterans with a primary diagnosis of PTSD who entered the residential rehabilitation program for PTSD at the VA Palo Alto Health Care System between July 1994 and December 2000. They found that recent behavior was the strongest predictor of future behavior in this population. Moreover, a lifetime history of suicide attempts had little predictive value and, perhaps, was much less informative than recent behavior in treatment planning (55).

Bell and Nye (42) suggested the utility of specific PTSD symptom clusters as a predictor of suicidal ideation among Vietnam veterans with a diagnosis of PTSD. They found that re-experiencing symptoms had the strongest association with current suicidal ideation, and a greater severity of re-experiencing symptoms was associated with a higher score for suicidal ideation within the past week. On the basis of this result, those with higher level of re-experiencing symptoms may be at greater risk for increases in suicidal ideation.

Guns play an important role in the suicide rate in the United States, and they are the most commonly used method for committing suicide (56). In 1998, 57% of all suicides were committed with a firearm, more than three times more than the next most common method, hanging (56). Desai et al. (57), in a very large sample, found that patients who were male, Caucasian, and who had a diagnosis of substance abuse or PTSD were significantly more

likely to use a firearm than another means to commit suicide. In that study individual sociodemographic and diagnostic data were used for a large sample of more than 100,000 psychiatric patients with PTSD and other diagnoses for whom the authors had mortality data. The authors examined the effect of ecological variables such as state suicide rates and gun legislation, while adjusting for several individual characteristics that could confound such an association. The results showed that state-level gun ownership rates were significantly correlated with the individual risk of suicide and the risk of gun suicide in this sample of psychiatric patients. Another interesting finding of this study was that the rates of hanging suicide were not inversely associated with gun ownership rates, and so there did not appear to be substantial substitution of hanging as a method for suicide when guns were less available. This finding strengthens the hypothesis that restricting access to guns will save lives by preventing suicide deaths. Thus, another significant risk factor for suicide in PTSD patients may be gun ownership, even if it is not possible to generalize these results to the general population because this was a sample of veterans who would presumably have more experience with and knowledge about firearms than the general population.

Torture and Suicide

The role of torture in PTSD has been investigated by many authors. As noted by Ferrada-Noli et al. (58), "the idea of a principal impact of PTSD (and also of reactive posttraumatic depression) in the pathogenesis of suicidal behavior among tortured victims may find indirect support in investigations describing the nature and prevalence of PTSD symptoms, since some of these symptoms have been reported earlier as being clinically associated with suicide risk factors." Hougen (59) found that suicide wishes or attempts were more frequent among those refugees with a history of torture than among matched controls without such experiences in a sample of twelve Lebanese refugees living in Denmark. Ferrada-Noli et al. (60) reported that 50% of a sample of 149 refugees with a history of severe trauma (70% of whom had experienced at least one episode of torture under captivity) showed suicidal behavior (suicidal thoughts, suicide attempts or suicide plans). Ferrada-Noli (58) demonstrated that there is a clear association between the mode of torture and preferred method for suicide. The population of this study consisted of a sample of 65 refugees who had both a diagnosis of PTSD and suicidal behavior. In this sample, 69% of the patients examined were refugees from the Middle East and Africa, with the rest from the former Yugoslavia, East Europe, and Latin America. The principal psychiatric diagnoses of PTSD were established according to DSM-III/DSM-IV diagnostic criteria, and diagnostic assessments were assisted with the PTSD Interview (PTSD-I) (61) to which was added one item referring to the subject's response (intense fear, helplessness or horror). Suicidal behavior was assessed using a modified structured interview produced by the National Board of Health and Welfare (62). The authors found a specific relationship between single suicide methods (methods identified in suicidal thoughts, previous attempts or stated suicidal plan) and methods of torture: (1) blunt violence to the head and body was associated with jumping from a height or in front of a passing train in the suicidal ideation, (2) water torture with drowning as the content of suicidal ideation, (3) electric shock with drug overdose as the content of suicidal ideation, (4) sexual violence drug overdose as the content of suicidal ideation, (5) sharp force torture with cutting/stabbing, and (6) physical torture with hanging.

As argued by the authors "the issue of the association between torture and content of suicidal ideation may suggest new pathways in the study of memory processes related to traumatic-threatening of our systems," and in studying this intriguing association, we may find new answers to the complicated issue of suicide dynamics (58).

Women and Racial Minority Groups

Due to the increasing number of women entering the military, their expanding occupational roles, and mounting evidence for the deleterious impact of war-zone exposure on their health, interest in women's military experiences has grown (62). Researchers and clinicians have examined whether women experience different deployment stressors when compared with men and whether deployment stressors have a different impact on the mental health of women and men. Several stressors that were not specifically related to the combat mission, but that represent interpersonal factors, may be particularly salient for the women deployed to the first Gulf War (63). As noticed by Vogt et al., that conflict represented the first time that women who were mothers were mobilized for strategic positioning by U.S. forces. Women are often primary caregivers, and so we might expect that worry about family disruptions would pose an important stressor for these women.

Vogt et al. studied a large range of deployment stressors that were content-valid for military personnel deployed to the 1990-1991 Gulf War (Gulf War I). The sample consisted of 495 Gulf War I veterans from across the United States. Participants were deployed from Active Duty, Reserve and National Guard units and represented the Army, Navy, Air Force, Marines and Coast Guard branches of the military. Eighty-three participants (26.2%) were women. The deployment stressor measures were taken from the Deployment Risk and Resilience Inventory (64). The results showed that, while women reported that they were exposed to more frequent incidents of sexual harassment and received less deployment social support, men reported more combat experiences. Regarding mental health outcomes, women and men reported similar levels of post-traumatic stress symptom severity and depression, but women reported higher levels of anxiety. Women also reported receiving somewhat less social support from supervisors and peers during deployment, and this finding is consistent with prior research (65,66). While men reported more combat exposure on average, for any given level of exposure, the expected level of post-traumatic stress symptomatology was the same for both genders. Moreover, the results from this study suggested that sexual harassment may have a stronger negative impact on men's than on women's mental health. A possible explanation for this finding could be that, when a man is sexually harassed, it may be more unexpected, have a more stigmatizing effect, and consequently, be more detrimental to mental health.

Several studies have demonstrated that there are some differences in the post-war psychological adjustment of veterans who are members of racial minority groups than that of their white counterparts (67,68). Some authors try to explain these differences by focusing on the issue of differential vulnerability, suggesting that participation in war involves more conflict for minorities than for whites. Ethnic and cultural factors have also been reported as potential risk factor for suicide among refugees (51, 60,69).

Using a community sample of Vietnam veterans, MacDonald et al. (70) examined the association between military experience variables and PTSD in Maori and non-Maori New

Zealanders. The racial composition of the sample was 22% Maori and 78% non-Maori. The frequency of combat engagement was evaluated using a 12-item combat exposure index prepared specifically for use with Vietnam veterans (71), while PTSD symptoms were measured with the Mississippi Scale (72). The results showed that Maori veterans scored significantly higher than non-Maori veterans on PTSD symptoms and suggested a constellation of combat factors that were worse for Maori veterans and which placed them at greater risk for developing PTSD.

Therefore, research confirms that there is a significant association between level of PTSD and race among Vietnam combat veterans, but the results indicate a differential experience rather than a differential vulnerability between groups of different races (70).

NEUROBIOLOGY OF SUICIDE RISK IN PTSD

PTSD and Cortisol

The role of cortisol is fundamental in the neurobiology of the acute stress response. After a traumatic event, sensory inputs are transmitted to the amygdala, and different corticals input drive the activation of several responses. The responses include the reticularis pontis caudalis, the sympathetic nervous system (with the release of adrenalin), the suppression of the parasympathetic nervous system, and the hypothalamic-pituitaryadrenal (HPA) axis (5). The hippocampus and amygdala activate the hypothalamus, which releases the corticotrophin release factor (CRF), which in turn activates the pituitary gland to release the adrenocorticotrophin hormone. This then stimulates the adrenal gland to release cortisol. The cortisol has several effects, the most important of which are to inhibit the sympathetic nervous system and attenuate the HPA axis. In healthy individuals, after a severe trauma, circulating catecholamines and cortisol return to normal levels within hours but, in individuals with chronic PTSD, both baseline CRF and cortisol levels are decreased.

Research has documented disturbances in the HPA axis, such as low 24-hour urinary cortisol levels and changes in the secretion of norepinephrine, dopamine, and their metabolites, in individuals with PTSD and other severe post-traumatic stress reactions (73,74, 75,76,77). Moreover, PTSD is often comorbid with major depressive episodes (MDE), and both major depression, PTSD and suicidal acts are often present in the same patient, and all are associated with HPA axis dysfunction. Research has demonstrated that MDE and suicide are associated with HPA overactivity while, on the other hand, PTSD is associated with HPA underactivity (78,79). Some studies of the role of the HPA axis in suicidal behavior suggest that there is an elevation of cortisol or dexamethasone resistance in future suicide completers with MDE (80,81,82). Heim et al. (83) found that depressed women who reported a history of abuse in childhood had higher rates of PTSD and lower cortisol responses to adrenocorticotrophin than non-abused depressed women did.

Because of this research, some researchers have studied HPA axis function in patients with comorbid MDE and PTSD, and its interaction with a history of suicidal behavior. Studies examining the risk of suicidal behavior in patients having PTSD and MDE have reported more suicidal ideation compared to patients with PTSD or MDE alone (84,49,85). Oquendo et al. (46) hypothesized that patients with comorbidity of MDE and PTSD would

have lower levels of cortisol compared to patients with MDE alone and healthy volunteers (HVs). In order to examine the relation of PTSD, MDE and suicidal behavior to HPA axis response and to evaluate the relation of serotonergic function to HPA function, they measured cortisol levels over a period of five hours and following a placebo versus a fenfluramine challenge. Results showed that the MDE+PTSD group had the lowest levels of plasma cortisol over the five hours of sampling, the MDE group had the highest plasma cortisol levels, and HVs had intermediate levels. Moreover, there was a significant increase in cortisol after fenfluramine administration in each of the three groups. This, as noted by the authors, suggested that the abnormality in HPA function in depressed subjects with or without PTSD involves suprahypophyseal components or changes in the adrenocorticol response. Oquendo et al. did not find a relation between attempter status, maximum lethality of suicide attempt, or number of suicide attempts and cortisol levels, and their research did not detect a relation between suicidal behavior and HPA function regardless of comorbid PTSD.

We found in the literature a correlation between salivary cortisol and self-rated post-traumatic symptoms (86). Cortisol is one of the most well-known and frequently used stress markers. In saliva, cortisol is present mainly in its unbound, biologically active form (86). The passage of cortisol from blood to saliva is by free diffusion through the acinar cells of the salivary glands. The sampling procedure is noninvasive, simple, and can be performed easily by patients. Moreover, saliva samples are more stable than blood samples and can be stored at room temperature for at least a week (87).

Aardal-Eriksson et al.(86) determined the relation of salivary cortisol to psychological distress immediately after a traumatic event and then during follow-up. They measured morning and evening salivary cortisol and ratings of psychological distress using the Impact of Events Scale (IES) (88), the Post Traumatic Symptom Scale (89), and the General Health Questionnaire (90). Salivary cortisol concentrations were studied in 31 United Nations soldiers at three time points: 5 days and 2 and 9 months following a mine accident in Lebanon. Five days after the accident, 15 subjects reported substantial post-traumatic distress according to the IES, as well as significantly lower morning and higher evening cortisol levels compared with the low-impact group. Within nine months, the post-traumatic distress of the high-impact group was reduced, accompanied by an increase in morning and a decrease in evening cortisol levels. This study supports the hypothesis that salivary cortisol is related to self-rated post-traumatic symptoms in the acute phase after a mine accident. Salivary cortisol assessment is easily applicable and valid in fieldwork as a complement to self-report instruments.

PTSD, Neuroendocrine Alterations and Suicidality

As we already shown, there is evidence in the literature which demonstrates neuroendocrine alterations in patients with PTSD (91, 79, 46). These neuroendocrine alterations also include elevations in the neuroactive steroid dehydroepiandrosterone (DHEA) and its sulfated derivative (92,93). These neuroactive steroids have an important role in the central nervous system because they can rapidly alter neuronal excitability by acting at ligand-gated ion channel receptors in the cell membrane such as γ-aminobutyric acid type-A (GABAA) receptors, among others (94). These steroids come not only from peripheral synthesis, but also many of them are synthesized *de novo* in the brain from cholesterol

(neurosteroids). The level of these neurosteroids is elevated during the acute stress response and may hence modulate the HPA changes observed in patients with PTSD (95,96).

Research suggests that neuroactive steroids may be connected to the pathophysiology of PTSD and other anxiety disorders, but little is known about the possible associations between neuroactive steroids and suicidal behaviors in patients with PTSD. The first report of an association between serum DHEA levels and suicide attempts in patients with PTSD was by Butterfield et al. (97). These authors examined neuroactive steroid levels in male veterans with PTSD. Their sample consisted of 130 male veterans meeting DSM-IV criteria for PTSD. A diagnosis of PTSD was based on archival record review, and they used the PTSD Checklist (98) to confirm this diagnosis. Patients were also evaluated with a validated, structured, risk interview composed of standardized measures which included: suicidal ideation or suicide attempt in the six months prior to admission, demographic information (age, ethnicity, marital status and educational level), smoking status and alcohol use disorders (Dartmouth Attitudes and Lifestyle Inventory Scale), childhood sexual abuse (Sexual Abuse Exposure Questionnaire) and childhood physical abuse (Conflict Tactics Scale) (99). Results showed that 25% of the patients reported a suicide attempt, and over two-thirds (69%) reported suicidal ideation. Interestingly, patients who had attempted suicide demonstrated significantly higher median levels of DHEA and estradiol. Of note is that DHEA levels remained associated with attempted suicide in the logistic regression analyses after controlling for age. In contrast, estradiol levels were no longer associated with a greater risk of a recent suicide attempt after adjustment for age. There were no significant differences observed in androstenedione or testosterone levels, and suicidal ideation was not statistically associated with neuroactive steroid levels. Even though a correlation between DHEA levels and attempted suicide was demonstrated, the mechanisms mediating this association in PTSD patients remains unclear.

PTSD and the Serotonergic System

Suicide risk has been associated with alterations in serotonergic variables such as lower 5-hydroxyindoleacetic acid (5-HIAA) in patients with a history of suicide attempts, lower 3H-imipramine binding and 5-hydroxytyptophan (5-HT) uptake in the platelets of suicide attempters, and lower central 5-HT function (100, 101,102,103). Blood platelets are often used as a limited peripheral model for central 5-HT neuron function because of their similarity with the central 5-HT synaptosomes. This similarity consists of pharmacodynamic aspects of 5-HT such as uptake, storage and release of 5-HT, platelet monoamine oxidase (MAO) type B, 5-HT transporters, 5-HT2 receptors, α2-adrenergic receptors, and binding sites for 3H-imipramine, 3H-paroxetine and 3H-LSD, and signalling mechanisms which have the same pharmacologic and kinetic characteristics with the central nervous receptors and binding sites (104).

Research has demonstrated an association between lower platelet 5-HT levels and suicidal behavior in psychotic and non-psychotic depressed patients (105,106). This association has been investigated also in PTSD patients (107). Kovacic et al. studied 120 male war veterans with combat related PTSD (current and chronic), diagnosed using the Structured Clinical Interview for DSM-IV (108) based on DSM-IV (109), the Clinician Administered PTSD Scale (110), the Hamilton Rating Scales for Depression-17 (111) and for Anxiety

(112), and the Positive and Negative Syndrome Scale (113). Patients were recruited from October 2001 to March 2005 from the Referral Centre for the Stress-related Disorders of the University Hospital Dubrava in Zagreb, Croatia. Inclusion criteria were medication-free male combat veterans between 18–65 years old, and exclusion criteria were a family history of psychosis or PTSD, a prior episode of any psychosis, a positive history of schizophrenia-spectrum disorders, bipolar disorder or neurodegenerative disorders, a history of cognitive dysfunction or mental retardation, alcohol dependence, past or current alcohol or other substance abuse within three months, a serious concomitant medical condition, clinically significant abnormalities in electrocardiogram or laboratory findings, and a positive urine screen for illicit drugs and alcohol. For this study, there were two control groups. The first consisted of non-PTSD psychiatric patients and the second control group consisted of medication-free healthy men with no personal or family history of psychopathology, no previous history of suicide attempt or a family history of suicide, free of psychiatric disorders, and no current medical treatment.

The results from this study showed significantly lower platelet 5-HT concentrations in suicidal as compared to non-suicidal PTSD patients or healthy controls and, on the other hand, demonstrated significantly higher platelet 5-HT concentration in non-suicidal compared to suicidal psychiatric comparison controls or healthy controls. These results, obtained on a large sample of male PTSD patients and male comparison patients without PTSD, together with previous results obtained from a large sample depressed patiets (105,106), indicate that reduced platelet 5-HT concentrations in suicidal veterans with combat related PTSD is a trait marker, predictive of suicidal behavior in patients with PTSD.

A POSSIBLE PSYCHOLOGICAL MODEL

PTSD is defined as a common reaction to traumatic events, and the characteristic PTSD symptoms are merely the reflections of the adaptive process implicated in the emotional processing of the event. The exposure to one or more traumatic events involves elements such as the nature of the event and its magnitude, and there are individual characteristics that determine the person's responses. These may result in individuals reaching and exceeding their adaptive capacity (114). In this case, the mnemonic traces relative to the trauma may not be archived, that is, not assimilated and integrated as normal experiences into cognitive schemata (115). The impact of the trauma, therefore, tends to persist, generating anxiety and constant hypervigilance and other cluster-B symptoms. In practice, individuals with persistent PTSD are unable to view the trauma as a time-limited condition. They are unable to recover naturally, and they remain in constant alarm in order to guard against a danger that, although distant in time, has not yet been overcome emotionally and which is still seen as a threat. In other words, instead of a physiological and adaptive response, they implement a maladaptive chronic response.

Avoidance symptoms represent a tactic to avoid stimuli and real situations that may cause intolerable anguish and pain. When adaptive and cognitive strategies are unsuccessful and create a too large emotional load, dissociative symptoms may occur that are protective against excessive and intolerable information. Amnesia results in difficulty and fragmentation in remembering what happened. Dissociation may link traumatic stress and suicidal behavior by

increasing hopelessness, fear, psychological pain and helplessness, thereby increasing the risk of self-destructive behavior (15, 114). Dissociation was found to be strongly associated with all measures of self-harm and suicidality in patients with dissociative disorder, and also in patients with borderline personality disorder, PTSD and alcohol abuse (116).

THERAPY AND SUICIDE PREVENTION

Pharmacological Treatment

Treatment of PTSD is very complex, especially when co-morbidity (depression, substance abuse and other anxiety disorders) or suicidal behavior complicate the picture. Additional problems in the management of PTSD are the tendency of PTSD to become chronic and the lower response of PTSD to pharmacotherapy. In the general population, one third of patients with an episode of PTSD fail to recover, even after many years (117), and this tendency is higher in veterans.

Guidelines for the pharmacological treatment of PTSD (e.g.,118) recommend the use of antidepressants as the first choice. Of these, the selective serotonin reuptake inhibitors (SSRIs), such as fluvoxamine, fluoxetine, citalopram, sertraline and paroxetine are preferable because they have fewer side effects. SSRIs are safe with regard to the risk of an overdose, and this is an important factors in suicidal patients. In particular, sertraline and paroxetine have received approval from the U.S. Food and Drug Administration for treatment of PTSD and have proved effective in reducing the hyperarousal, intrusion and numbing symptoms of PTSD. SSRIs were also effective for comorbid disorders, such as depression, panic disorder and social phobia, and reduce aggression, impulsivity and suicidality (119). Unfortunately some studies suggest that military PTSD patients may not respond to SSRIs as well as civilians do (120,121,122). However, these discrepant results may be due to the possibility that PTSD in veterans is more severe and chronic than PTSD in the general population (123). Martenyi and colleague (124) tested the efficacy of fluoxetine in veterans and civilian with recent PTSD. Compared with placebo, fluoxetine was associated with significantly greater improvement in all patients.

Another possible problem is the possibility that SSRIs may enhance the risk of suicide. The U.S. Food and Drug Administration recommends attention in use of antidepressants because of the possibility that this treatment increases the risk of suicidal ideation and behavior in the young (18 to 25 year-old age group). However, Gibson et al. (125) demonstrated that the use of SSRIs or non-SSRI antidepressants in a sample of 114,475 veterans who had received a diagnosis of depression significantly decreased the risk of a suicide attempt. Treatment with SSRIs had a greater protective effect than treatment with tricyclics or no antidepressant treatment. Nefazodone and venlafaxine (serotonin-potentiating non-SSRIs) were found to be effective in ameliorating PTSD symptoms, but less so in combat patients (123). Thus, they may be considered to be second choice medications.

Tricyclic antidepressants (desipramine, amitriptyline and imipramine) ameliorate the intrusive symptoms, as well as anxiety and depression, while having little effect on the avoidance and numbing symptoms (126). The monoamine oxidase inhibitors have less efficacy, and overall they are considered to be drugs of third choice. Other agents, including

mood stabilizers such as carbamazepine, lithium and valproate, may be effective in the treatment of impulsivity and affective lability and in reducing aggressive behavior in patients with PTSD, either alone or in combination with an SSRI. In particular, carbamazepine has been found to be useful in veterans with PTSD, irritability and comorbid alcoholism and in reducing intrusive symptoms and flashbacks (127,128).

Antipsychotics have been studied for the treatment of refractory patients and as a medication in PTSD patients with impulsivity, recurrent flashbacks or paranoia. Atypical antipsychotics (such as olanzapine, quetiapine and risperidone) may be useful for patients with PTSD and psychotic symptoms or in the treatment of PTSD refractory to other agents (129). Indications for prescribing antipsychotics for patients with PTSD include aggressive symptoms, intrusive symptoms, dissociation, hypervigilance and self-destructive behavior (130). Benzodiazepines have only a modest impact on anxiety, and pose a risk of dependence and abuse and use as potential agents for committing suicide, and so should not be used for patients with PTSD.

The treatment of war veterans with chronic PTSD, suicidal behavior and comorbid conditions tends to be more difficult. The percentage of unsuccessful treatment responses is very high. In particular, the presence of suicidality is a possible reason for the poor response or refractoriness to therapy (psychological and/or pharmacological therapy). In these cases, pharmacotherapy should be the primary modality for treating PTSD patients, both in the short-term and the long-term (119).

Psychotherapy

Cognitive-behavioral treatment (CBT) has been found to be useful for treating patients with PTSD, as have exposure therapy, systematic desensitization, stress inoculation training, cognitive processing therapy, cognitive therapy, assertiveness training, biofeedback, relaxation training, and combined CBT (118). These techniques are generally short-term, averaging approximately 8–12 sessions, meeting once or twice weekly. As reported by Foa et al., exposure therapy has been the focus of most studies (12), including well-controlled studies, all finding positive results for this treatment for patients with PTSD (118).

Time-limited psychotherapy can also results in sustained improvement in psychosocial functioning and reduced levels of psychiatric and stress-related symptomatology (131). Group-based exposure therapy (GBET) has also shown effectiveness in reducing symptoms in a sample of war related PTSD patients (132).

Eye movement desensitization and reprocessing (EMDR) consists of an “integrative treatment for PTSD during which the patient is asked to hold in mind a disturbing image, an associated negative cognition, and bodily sensations associated with a traumatic memory, while tracking the clinician’s moving finger in front of his or her visual field” (118). As was found for other methods of treatments, the evidence is stronger for the beneficial effect of EMDR on persons with single-event civilian trauma than on multiply traumatized, treatment-refractory, chronically ill, war veterans (118).

Group therapy for PTSD has also been recommended, both in “covering” or ”uncovering” formats, that is, whether or not the traumatic experiences are addressed directly (118). Three distinct types of group therapy have been discussed in the literature: (1) supportive group therapy, which represents a “covering” strategy, and two “uncovering”

types which are (2) psychodynamic groups and (3) cognitive-behavioral group therapy. Only a few empirical investigations with randomized designs, control variables and validated outcome measures have been reported for psychodynamic therapy (118). This treatment requires insight and courage, and involves four to five 45 to 50-minute sessions each week over the course of 2 to 7 (or more) years. This therapy "seeks to reengage normal mechanisms of adaptation by addressing what is unconscious and, in tolerable doses, making it conscious" (118). The therapist–patient relationship, in itself, is a crucial factor in the patient's response, and plays an important role the creation of a holding environment, an essential step for the emergence of trauma-related memories and for the "containment" of their accompanying affects".

CONCLUSIONS

As we have shown, research has demonstrated that PTSD is associated with significant morbidity and mortality and increases the risk for suicidal behavior as much as 14-fold (23,5). Having a history of PTSD or exposure to traumatic stressors is associated with higher rates of morbidity (24,25) and mortality (37). Moreover, there is a clear association between PTSD and suicidal behavior (29,30, 31,20,21). One of the symptoms which is found to be strongly predictive of suicide in patients with PTSD is re-experiencing symptoms (42).

Given this strong association between PTSD and suicide, it is of great importance to prevent suicide in these patients. Even today, there are many conflicts in many parts of the world in which thousands of people are involved, both military and civilian. As we have seen from international press reports, suicide in the military personnel deployed in Iraq and Afghanistan is very common. The suicide rate in the U.S. Army may be as high as 20.2 per 100,000 per year (133), which is the highest suicide rate in the history of U.S. Army. For the first time since the Vietnam War, the suicide rate in the military is higher than that in the general population. This higher rate of suicide seems to be related to combat-stress, and the conflicts in Iraq and Afghanistan seem to be particularly stressful for soldiers. The rate of PTSD may be high and increasing in the troops in these wars. In fact, the suicide rate has risen from the year 2006 when it was 16.9 (134).

Sound suicide prevention strategies are the best way to reduce this high rate of suicide in patients with PTSD. As reported by Foa et al. (118), who developed treatment guidelines for PTSD under the auspices of the PTSD Treatment Guidelines Task Force established by the Board of Directors of the International Society for Traumatic Stress Studies (ISTSS) in November 1997, "self-destructive and impulsive behaviors, while not part of the core PTSD symptom complex, are recognized as associated features of this disorder that may profoundly affect clinical management. Therefore, the routine assessment of all patients presenting with PTSD should include a careful evaluation of current suicidal ideation and past history of suicidal attempts. Risk factors for suicide should also be assessed, such as current depression and substance abuse. If significant suicidality is present, it must be addressed before any other treatment is initiated. If the patient cannot be safely managed as an outpatient, hospitalization should be the immediate clinical focus. If suicidality is secondary to depression and/or substance abuse, clinical attention must focus on either or both conditions before initiating treatment for PTSD" (118).

The first step in the evaluation of a patient with PTSD should include the evaluation of current suicidal behavior and the past history of suicide attempts. Only after this, is it possible to decide the right management of the case and the right treatment for the patient. In general, psychotherapy (specifically, cognitive-behavioral therapy) and medication (specifically, SSRIs) have both been shown to be effective treatments for PTSD (118). There is also some evidence that psychodynamic psychotherapy, hypnotherapy and EMDR are also effective in the treatment of PTSD, but the research is not conclusive. However, as noted by Foa et al.(118), "the absence of evidence for a technique or approach does not imply that it does not work, only that it has not yet been subjected to rigorous scientific scrutiny." There have been no studies that have systematically examined the value of combining psychotherapy with medication, or combinations of medications (118), although research on other disorders (e.g., depression) has shown benefits from combination approaches.

Of note is that many patients do not benefit from the first line of treatment. This phenomenon of treatment resistance was noted particularly in Vietnam War veterans, but has also been noted in other populations of patients. These patients could be especially good candidates for therapeutic strategies which include multiple treatment modalities such as meditation, psychotherapy, family therapy and rehabilitation therapy (118).

There has been little research on strategies for reducing suicidal behavior in military personnel. There is evidence that even telephone counseling could be effective for preventing suicide (135) and could play an important role for veterans because this population has demonstrated a reluctance to seek treatment and has shown avoidance of conventional counseling agencies (136,137). It has also been demonstrated that a significant number of Vietnam veterans experience marked psychological difficulties at times when conventional counseling agencies are not accessible, problems such as nightmares, traumatic memories, sleep disturbance, loneliness and alcohol abuse (135). Moreover, a significant proportion of those with PTSD do not seek treatment for their symptoms (117), although the likelihood of treatment seeking increases after exposure to multiple types of trauma (138). The greater likelihood of treatment after experiencing multiple types of trauma could be due to the greater PTSD severity, and this means that these patients usually seek treatment when they have a more serious clinical condition (138) which, in turn, could result in a higher risk of suicide.

Trauma risk management (TRiM), which is an intensive PTSD psychoeducational management strategy based on peer-group risk assessment developed by the U.K. Royal Navy, may have a number of benefits in terms of reducing stigmatizing attitudes and increasing help-seeking behavior (139). This strategy seeks to modify attitudes about PTSD, provide support and education, and identify and refer at-risk personnel. Results from a recent study also demonstrated that TRiM had significant effect on attitudes to stress and PTSD, seeking help from TRiM practitioners and general mental health (139). Thus, TRiM could have a significant effect in reducing stigma which may be more devastating, life-limiting and long-lasting than the primary illness (140).

REFERENCES

[1] American Psychiatric Association. *Diagnostic and statistical manual formental disorders 3rd ed.* Washington DC, 1980

[2] American Psychiatric Association. *Diagnostic and statistical manual for mental disorders 4th edition*, Text Revision.. Washington DC, 2000

[3] *Kaplan & Sadock's Comprehensive Textbook of Psychiatry* (2 Volume Set) by Benjamin J. Sadock (Editor), Virginia A. Sadock (Editor) Lippincott Williams & Wilkins Publishers, 7th edition. January 15, 2000: 3050-3092

[4] Kashdana TB, Elhaib JD, Frueh BC: Anhedonia and emotional numbing in combat veterans with PTSD. *Behaviour Research and Therapy* 2006; 44: 457–467.

[5] Davidson JRT, Stein DJ, Shalev AJ, Yehuda R. Posttraumatic Stress Disorder: Acquisition, Recognition, Course, and Treatment. *J Neuropsychiatry Clin Neurosci* 2004; 16:2.

[6] World Health Organization. *The ICD-10 classification of mental and behavioral disorders. Clinical descriptions and diagnostic guidelines*. Geneva: WHO, 1992

[7] Solomon Z, Kotler M, Shalev A, Lin R: Delayed onset PTSD among Israeli veterans of the 1982 *Lebanon War Psychiatry* 1989; 52:428-36

[8] Prigerson HG, Maciejewski PK, Rosenheck RA: Combat trauma: trauma with highest risk of delayed onset and unresolved posttraumatic stress disorder symptoms, unemployment, and abuse among men. *J Nerv Ment Dis* 2001;189(2):99-108.

[9] Price RK, Riska NK, Hadena AH, Lewisa CE, Spitznagelb EL: Post-traumatic stress disorder, drug dependence, and suicidality among male Vietnam veterans with a history of heavy drug use. *Drug and Alcohol Dependence* 2004; 76S(S1) ,S31–S43

[10] Engel C, Engel A, Campbell S, McFall M, Russo J, Katon W: Posttraumatic stress disorder symptoms and precombat sexual and physical abuse in Desert Storm veterans. *J Nerv Ment Disease* 1993; 181: 683-688.

[11] Keane, T.M., Scott, W.O., Chavoya, G.A., Lamparski, D.M., & Fairbank, J.A. Social support in Vietnam veterans with posttraumatic stress disorder: A comparative analysis. *Joumal of Consulting and Clinical Psychology* 1993; 64: 95-102

[12] Solomon, Z., Mikulincer, M., & Avitzur, E. Coping, locus of control, social support, and combat- related posttraumatic stress disorder: A prospective study. *Joumal of Personality and Social Psychology* 1988; 55: 279-285.

[13] Friedman MJ, Southwick. Toward pharmacotherapy for post-traumatic stress disorder. In Friedman MJ, Charney DS, Deutch Ay, eds. *Neurobiological and clinical consequences of stress*. First Edition. Philadelphia: Lippincott-Raven, 1995; 465-482.

[14] Green, BL. Defining trauma: terminology and generic stressors dimensions. *J of Applied.Social.Psychology* 1995; 20:1632-1642.

[15] Mehlum L. *Traumatic stress and suicidal behaviour: an important target for treatment and prevention.* In Prevention and Treatment of Suicidal Behaviour: From Science to Practice. Keith Hawton. Oxford University Press, 2005

[16] Hoge CW, Castro CA, Messer SC, McGurk D, Cotting DI, Koffman RL: Combat Duty in Iraq and Afghanistan, Mental Health Problems, and Barriers to Caren . *New Engl J Med* 2004; 351(1): 13-22 .

[17] Sareen J, BSc, J. Cox BJ, PhD, Afifi TO, Stein MB, Belik S, Meadows G, Asmundson G: Combat and Peacekeeping Operations in Relation to Prevalence of Mental Disorders and Perceived Need for Mental Health Care Findings From a Large Representative Sample of Military Personnel *Arch Gen Psychiatry* 2007; 64(7):843-852

[18] Adler AB, Wright KM, Bliese PD, Eckford R, Hoge CW () A2 Diagnostic Criterion for Combat-Related Posttraumatic Stress Disorder *Journal of Traumatic Stress* 2008; 21(3):301–308

[19] Kessler RC, McGonagle KA, Zhao S, Nelson CB, Hughes M, Eshleman S, Wittchen H-U, Kendler KS: Lifetime and 12-month prevalence of psychiatric disorders in the United States: Results from the National Comorbidity Survey. *Arch Gen Psychiatry* 1994; 51:8 –19.

[20] Sareen J, Houlahan T, Cox BJ, Asmundson GJG. Anxiety Disorders Associated With Suicidal Ideation and Suicide Attempts in the National Comorbidity Survey. *J Nerv Ment Dis* 2005;193: 450–454

[21] Bullman TA, Kang HK: Posttraumatic stress disorder and the risk of traumatic deaths among Vietnam veterans. *J Nerv Ment Dis*. 1994; 182:604– 610.

[22] Drescher, Craig S. Rosen, Thomas A. Burling, David W. Foy: Causes of Death Among Male Veterans Who Received Residential Treatment for PTSD Kent D. *Journal of Traumatic Stress* 2003; 16(6): 535–543

[23] Davidson JR, Hughes D, Blazer DG, George LK: Posttraumatic stress disorder in the community: an epidemiological study. *Psychol Med* 1991; 21: 713–721

[24] Boscarino JA. Diseases among men 20 years after exposure to severe stress: implications for clinical research and medical care. *Psychosom Med* 1997;59:605- 14

[25] Cwikel J, Abdelgani A, Goldsmith JR, Quastel M, Yevelson II: Two year follow up study of stress-related disorders among immigrants to Israel from the Chernobyl area. *Environ Health Perspect* 1997; 105(Suppl 6):1545 – 50

[26] Scott S: *Wreath for those killed, even at their own hands*. New York Times, 2005 A20

[27] Rosenheck R, Fontana A: Impact of efforts to reduce inpatient costs on clinical effectiveness: Treatment of posttraumatic stress disorder in the Department of Veterans Affairs. *Med Care* 2001; 39:168 –180

[28] Beckham JC, Feldman ME, Kirby AC, Hertzberg MA, Moore SD: Interpersonal violence and its correlates in Vietnam veterans with chronic posttraumatic stress disorder. *J Clin Psychol* 1997; 53:859–869.

[29] Ferrada-Noli M, Asberg M, Ormstad K, Lundin T, Sundbom E: Suicidal behavior after severe trauma, part 1: PTSD diagnoses, psychiatric comorbidity and assessments of suicidal behavior. *J Trauma Stress* 1998; 11:103–112

[30] Kotler M, Iancu I, Efroni R, Amir M: Anger, impulsivity, social support and suicide risk in patients with posttraumatic stress disorder. *J Nerv Ment Dis* 2001 ; 189:162–167.

[31] Marshall RD, Olfson M, Hellman F, Blanco C, Guardino M, Struening EL: Comorbidity, impairment and suicidality in subthreshold PTSD. *Am J Psychiatry* 2001; 158:1467–1473.

[32] Hendin H, Haas AP:Suicide and guilt as manifestations of PTSD in Vietnam combat veterans. *Am J Psychiatry* 1991; 149:142–143

[33] Hyer L, McCranie EW, Woods MG, Boudewyns PA: Suicidal behaviour among chronic Vietnam theatre veterans with PTSD. *J Clin Psychol 1*990; 46:713–721.

[34] Pollock DA, Rhodes P, Boyle CA, Decoufle P, McGee DL: Estimating the number of suicides among Vietnam veterans. *Am J Psychiatry 1*990; 147:772–776.

[35] Kramer, Teresa L, Lindy, Jacob D, Green, Bonnie L, Grace, Mary C, Leonard, Anthony C: The comorbidity of post-traumatic stress disorder and suicidality in Vietnam veterans. *Suicide & Life-Threatening Behavior*. New York 1994; 24: 58

[36] Farberow NL, Kang HK, Bullman TA: Combat experience and Postservice psychosocial status as Predictors of suicide in Vietnam veterans. *J Nerv Ment Disease* 1990 ; 178, 1

[37] Boehmer TKC, Flanders WD, McGeehin MA, Boyle C, Barrett DH: Postservice mortality in Vietnam veterans: 30-year follow-up. *Arch Intern Med* 2004;164:1908 - 16.

[38] Watanabe KK, Kang HK: Military service in Vietnam and the risk of death from trauma and selected cancers. *Ann Epidemiol* 1995;5: 407- 12

[39] Boscarino JA: Posttraumatic stress disorder and mortality among US Army veterans 30 years after military service. *Ann Epidemiol* 2006a ; 16: 248- 56.

[40] Boscarino JA: External-cause mortality after psychologic trauma: the effects of stress exposure and predisposition. *Comprehensive Psychiatry 2*006b; 47: 503– 514.

[41] Freeman TW, Keesee N, Thorton C, Gillette G, Young K: Dissociative symptoms in Posttraumatic stress disorder subjects with a history of suicide attempts. *J Nerv Ment Disease* 1995; 183(10):664-6.

[42] Bell JB, Nye EC: Specific symptoms predict suicidal ideation in Vietnam combat veterans with chronic post-traumatic stress disorder. *Mil Med* 2007; 172(11): 1144-7.

[43] Kozariæ-Kovaèiæ D, Dubravka Kocijan Hercigonja, Grubišiæ-Iliæ M: Posttraumatic Stress Disorder and Depression in Soldiers with Combat Experiences. *Croat Med J* 2001; 42:165-170.

[44] Hankin CS, Spiro A, Miller DR, Kazis L: Mental Disorders and Mental Health Treatment Among U.S. Department of Veterans Affairs Outpatients: The Veterans Health Study. *Am J Psychiatry* 1999; 156:1924–1930.

[45] Campbell DG, Felker BL, Liu C, Yano EM, Kirchner JE, Chan D, Rubenstein LV, Chaney EF: Prevalence of Depression–PTSD Comorbidity: Implications for Clinical Practice Guidelines and Primary Care-based Interventions. *J Gen Internal Med* 2007; 22:711–718.

[46] Oquendo MA, Echavarria G, Galfalvy HC, Grunebaum MF, Burke A, Barrera A, Cooper TB, Malone KM, Mann JJ: Lower Cortisol Levels in Depressed Patients with Comorbid Post-Traumatic Stress Disorder. *Neuropsychopharmacology* 2003a; 28: 591–598.

[47] Rudd MD, Dahm PF, Rajab H: Diagnostic comorbidity in persons with suicidal ideation and behavior. *American Journal of Psychiatry* 1993; 150: 928-934.

[48] Oquendo M, Brent DA, Birmaher B, Greenhill L, Kolko D, Stanley B, Zelazny J, Burke AK, Firinciogullari S, Ellis SP, Mann JJ: Posttraumatic stress disorder comorbid with major depression: factors mediating the association with suicidal behavior. *Am J Psychiatry* 2005; 162(3):560-6.

[49] Freeman TW, Roca V, Moore WM: A comparison of chronic combat-related posttraumatic stress disorder (PTSD) patients with and without a history of suicide attempt. *J Nerv Ment Dis* 2000; 188: 460–463.

[50] Sher L: The concept of post-traumatic mood disorder. *Medical Hypotheses* 2005; 65: 205–210.

[51] Ferrada-Noli, M, Asberg, M, & Ormstad, K: Pathoanatomic findings and blood alcohol analysis at autopsy (BAC) in forensic diagnoses of undetermined suicide. A cross-cultural study. *Forensic Science International* 1995; 78: 157-163.

[52] (zoracic-kovacic 2008) Kozaric-Kovacic D, Gamberger D, Marinic I, Grubisic M, Romic Z: Integrative Diagnostic Model for PTSD and Suicidality. Edited by B.K.

Wiederhold. Lowering suicide risk in returning troops: *Wounds of War*. IOS Press, US, 2008.

[53] Zivin K, Kim HM, McCarthy JF, Austin KL, Hoggatt KJ, Waiters H, Vaienstein M: Suicide Mortality Among Individuals Receiving Treatment for Depression in the Veterans Affairs Health System: Associations with Patient and Treatment Setting Characteristics. *American Journal of Public Health* 2007; 97(12).

[54] Levy CJ: Agent Orange exposure and Posttraumatic Stress Disorder. *J Nerv Ment Disease* 1988. 176: 4.

[55] Hartl TL, Rosen G, Drescher K, Lee TT, Gusman F: Predicting High-Risk Behaviors in Veterans With Posttraumatic Stress Disorder. *J Nerv Ment Dis* 2005; 193: 464–472.

[56] Romero MP, Wintemute GJ: The epidemiology of firearm suicide in the United States. *J Urban Health* 2002; 79: 39-48.

[57] Desai RA, Dausey D, Rosenheck RA. *Military Medicine.* Bethesda 2008; 173: 8, 721, 8 pgs.

[58] Ferrada-Noli M, Asberg M, Ormstad K: Suicidal Behavior After Severe Trauma. Part 2: The Association Between Methods of Torture and of Suicidal Ideation in Posttraumatic Stress Disotrder. *Journal of Traumatic Stress* 1998b; 11: 1.

[59] Hougen, HP: Physical and psychological sequelae to torture. A controlled clinical study of exiled asylum applicants. *Forensic Science Internationa*l 1988; 39: 5-11.

[60] Ferrada-Noli M, Asberg M, Ormstad K, Lundin T, Sundbom E: Suicidal behaviour after severe trauma. Part 1: PTSD diagnoses, pychiatric comorbidity and assessments of suicidal behavior. *Journal of Traumatic Stress* 1996;

[61] Watson CG, Juba MP, Manifold V, Kucala T, Anderson PED: The PTSD Interview: Rationale, description, reliability, and concurrent validity of a DSM-III-based technique. *Journal of Clinical Psychology* 1991; 47 : 179-188.

[62] Beskow J. *The problem of suicide.* National Board of Health and Welfare. Stockholm: Utbildningsproduktion AB 1983.

[63] Vogt DS, Pless AP, King LA, King DW: Deployment Stressors, Gender, and Mental Health Outcomes Among Gulf War I Veterans. *Journal of Traumatic Stress* 2005; 18: 2, 115-127.

[64] King LA, King DW, Vogt DS, Knight JA, Samper RE: Deployment Risk and Resilience Inventory: A collection of measures for studying deployment related experiences of military personnel and veterans. *Military Psychology 2*006; 18: 89–120.

[65] Rosen LN, Wright K, Marlowe D, Bartone P, Gifford RK: Gender differences in subjective distress attributable to anticipations of combat among U.S. Army soldiers deployed to the Persian Gulf during Operation Desert Storm. *Military Medicine* 1999; 164:753-757.

[66] Wolfe J, Brown PJ, Kelley JM: Reassessing war stress: Exposure and the Persian Gulf War. *Journal of Social Issues* 1993; 49: 15-31.

[67] Penk WE, Robinowitz R, Black J, Dolan ME, Bell W, Dorsett D, Ames M, Noriega L: Ethnicity: Post-traumatic stress disorder (PTSD) differences among Race, Combat and PTSD in Vietnam Veterans 123 Black, White, and Hispanic veterans who differ in degrees of combat exposure in Vietnam. *Journal of Clinical Psychiatry* 1989; 45: 729-735.

[68] Kulka RA, Schlenger WE, Fairbank JA, Hough R, Jordon B, Mannar C, Weiss D. *Trauma and the Vietnam War generation*. New York: Brunner/Mazel , 1990.

[69] Ferrada-Noli M, Sundbom E: Cultural bias in suicidal behavior among refugees with posttraumatic stress disorder. *Nordic Journal of Psychiatry* 1996; 3: 185-191.
[70] MacDonald C, Chamberlain K, Long N: Race, Combat, and PTSD in a Community Sample of New Zealand Vietnam War Veterans. *Journal of Traumatic Stress* 1997; 10: 1.
[71] Boulanger G, Kadushin C. *The Vietnam veteran redefined*. London: Lawrence Erlbaum Associates, 1986.
[72] Keane TM, Caddell JM, Taylor KL: Mississippi Scale for Combat-related Posttraumatic Stress Disorder: Three studies in reliability and validity. *Journal of Consulting and Clinical Psychology* 1988; 56: 85-90.
[73] Charney DS, Deutch AY, Krystal JH, Southwick SM, Davies M: Psychobiologic mechanisms of posttraumatic stress disorder. *Arch Gen Psychiatry* 1993; 50: 294–305.
[74] Dallman MF: Stress update. Adaptation of the hypothalamic- pituitary adrenal axis to chronic stress. *TEM* 1993; 4: 62–69.
[75] Schedlowski M, Weichert D, Wagner TOF: Acute psychological stress increases plasma levels of cortisol, prolactin and TSH. *Life Sci* 1992; 50: 1201–1205.
[76] Yehuda R, Southwick SM, Nussbaum SM: Low urinary cortisol excretion in patients with posttraumatic stress disorder. *J Nerv Ment Dis* 1990; 178: 366–369.
[77] Yehuda R, Kahana B, Binder-Brynes K, Southwick SM, Mason JW, Giller EL: Low urinary cortisol excretion in holocaust survivors with posttraumatic stress disorder. *Am J Psychiatry* 1995; 152: 982–986.
[78] Carroll BJ: The dexamethasone suppression test for melancholia. *Br J Psychiatry* 1982; 140: 292–304.
[79] Yehuda R: Current status of cortisol findings in PTSD. *Psychiatric Clin North Am* 2001; 25: 341–368.
[80] Coryell W, Schlesser M: The dexamethasone suppression test and suicide prediction. *Am J Psychiatry* 2001; 158: 748–753.
[81] Meltzer HY, Perline R, Tricou BJ, Lowy M, Robertson A: Effect of 5-hydroxytryptophan on serum cortisol levels in major affective disorders. II. Relation to suicide, psychosis and depressive symptoms. *Arch Gen Psychiatry* 1984; 41: 379–387.
[82] Norman WH, Brown WA, Miller IW, Keitner GI, Overholser JC: The dexamethasone suppression test and completed suicide. *Acta Psychiatr Scand* 1990; 81: 120–125
[83] Heim C, Newport DJ, Bonsall R, Miller AH, Nemeroff CB: Altered pituitary-adrenal axis responses to provocative challenge tests in adult survivors of childhood abuse. *Am. J. Psychiatry* 2001; 158: 575–581 .
[84] Brady KT, Killeen TK, Brewerton T, Lucerini S: Comorbidity of psychiatric disorders and posttraumatic stress disorder. *J Clin Psychiatry* 2000; 61 (7): 22–32.
[85] Shalev AY, Freedman S, Peri T, Brandes D, Sahar T, Orr SP et al: Prospective study of posttraumatic stress disorder and depression following trauma. *Am J Psychiatry* 1998; 155: 630–637.
[86] Aardal-Eriksson E, Eriksson TE, Thorell LH: Salivary Cortisol, Posttraumatic Stress Symptoms, and General Health in the Acute Phase and during 9-Month Follow-Up. *Biol Psychiatry* 2001; 50: 986–993.
[87] Aardal E, Holm A-C: Cortisol in saliva—Reference ranges and relation to cortisol in serum. *Eur J Clin Chem Clin Biochem* 1995; 33: 927–932.

[88] Horowitz M, Wilner N, Alvarez W: Impact of Event Scale: A measure of subjective stress. *Psychosom Med* 1979; 41: 209–217.
[89] Holen A, Sund A, Weisaeth L. *The Alexander L. Kielland Disaster,* March 27 1980. Oslo: University of Oslo, Division of Disaster Psychiatry, 1983.
[90] Goldberg DP, Hillier VF: A scaled version of the General Health Questionnaire. *Psychol Med* 1979; 9: 139–145.
[91] Yehuda R: Current status of cortisol findings in post-traumatic stress disorder. *Psychiatr Clin North Am* 2002; 25: 341–368.
[92] Spivak B, Maayan R, Kotler M, Mester R, Gil-Ad I, Shtaif B, Weizman A: Elevated circulatory level of GABAA-antagonistic neurosteroids in patients with combat-related post-traumatic stress disorder. *Psychol Med* 2000; 30: 1227–1231.
[93] Sondergaard HP, Hansson LO, Theorell T: Elevated blood levels of dehydroepiandrosterone sulfate vary with symptom load in PTSD: findings from a longitudinal study of refugees in Sweden. *Psychother Psychosom* 2002; 71: 298–303.
[94] Paul SM, Purdy RH: Neuroactive steroids. *Faseb J* 1992; 6: 2311–2322.
[95] Wolkowitz OM, Epel ES, Reus VI: Stress hormone-related psychopathology: pathophysiological and treatment implications. *World J Biol Psychiatry* 2001; 2: 115–143.
[96] Morrow AL, Devaud LL, Purdy RH, Paul SM: Neuroactive steroid modulators of the stress response. *Ann NY Acad Sci* 1995; 771: 257–272.
[97] Butterfield MI, Stechuchak KM, Connor KM, Davidson JRT, Wang C, MacKuen CL, Pearlstein AM, Marx CE: Neuroactive Steroids and Suicidality in Posttraumatic Stress Disorder. *Am J Psychiatry* 2005; 162: 2.
[98] Blanchard EB, Jones-Alexander J, Buckley TC, Forneris CA: Psychometric properties of the PTSD Checklist (PCL). *Behav Res Ther* 1996; 34: 669–673.
[99] Rosenberg SD, Goodman LA, Osher FC, Swartz MS, Essock SM, Butterfield MI, Constantine NT, Wolford GL, Salyers MP: Prevalence of HIV, hepatitis B, and hepatitis C in people with severe mental illness. *Am J Public Health* 2001; 91: 31–37.
[100] Roy A, Linnoila M: Suicidal behavior, impulsiveness and serotonin. *Acta Psychiatr Scand* 1988; 78: 529–35.
[101] Mann JJ: The neurobiology of suicide. *Nat Med* 1998; 4: 25–30.
[102] Nordstrom P, Samuelsson M, Asberg M, Traskman-Bendz L, Aberg-Wistedt A, Nordin C, et al. CSF: 5-HIAA predicts suicide risk after attempted suicide. *Suicide Life-Threat Behav* 1994; 24: 1–9.
[103] Mann JJ: Neurobiology of suicidal behaviour. *Nature Reviews Neuroscience* 2003; 4
[104] Lesch KP, Baling U, Gross J, Strauss K, Wolozin B, Murphy DL, et al: Organization of the human serotonin transporter gene. *J Neural Transm* 1994; 95: 157–62.
[105] Muck-Seler D, Jakovljevic M, Pivac N: Platelet 5-HTconcentrations and suicidal behavior in recurrent major depression. *J Affect Disord* 1996; 39: 73–80.
[106] Pivac N, Jakovljevic M, Muck-Seler D, Brzovic Z: Hypothalamic–pituitary– adrenal axis function and platelet serotonin concentrations in depressed patients. *Psychiatry Res* 1997; 73: 123–32.
[107] Kovacic Z, Henigsberg N, Pivac N, Nedic G, Borovecki A: Platelet serotonin concentration and suicidal behavior in combat related posttraumatic stress disorder. *Progress in Neuro Psychopharmacology & Biological Psychiatry* 2008; 32: 544–551.

[108] First M, Spitzer R, Williams J, Gibbon M. Structured clinical interview for DSM-IV Axis I disorders. *Handbook of Psychiatric Measures.* Washington, DC: American Psychiatric Association, 2000.

[109] American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4th ed. Washington, DC. *American Psychiatric Press*, 1994.

[110] Weathers FW, Keane TM, Davidson JRT: Clinician-administered PTSD scale: a review of the first ten years of research. *Depress Anxiety* 2001; 13: 132–56.

[111] Hamilton M: A rating scale for depression. *J Neurol Neurosurg Psychiatry* 1960; 23: 56–62.

[112] Hamilton MC. Hamilton anxiety scale (HAMA). In: Schutte NS, Malouff JM, editors. *Sourcebook of adult assessment* (*Applied clinical psychology).* NY: Plenum Press, 1959.

[113] Kay SR, Fiszbein A, Opler LA: The Positive and Negative Syndrome Scale (PANSS) for schizophrenia. *Schizophr Bull* 1987; 13: 261–76.

[114] Adams DM, and Lehnert KL: Prolonged Trauma and Subsequent Suicidal Behavior: Child Abuse and Combat Trauma Reviewed. *Journal of Traumatic Stress* 1997; 10: 4.

[115] Horowitz, M: Stress-response syndromes: A review of posttraumatic and adjustment disorders. *Hospital and Community Psychiatry* 1986; 37: 241-249.

[116] Foote B, Smolin Y, Neft DI, Lipschitz D: Dissociative disorders and suicidality in psychiatric outpatients *J Nerv Ment Dis* 2008; 196(1): 29-36.

[117] Kessler RC, Sonnega A, Bromet E, Hughes M, Nelson CB: Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry* 1995; 52: 1048–1060.

[118] Foa EB, Keane TM, Friedman MJ. Guidelines for Treatment of PTSD. *Journal of Traumatic Stress* 2000; 13: 4.

[119] Friedman MJ, Donnelly CL, Mellman TA: Pharmacotherapy for PTSD. *Psychiatric Annals* 2003; 33: 1 57-62 .

[120] van der Kolk BA, Dreyfuss D, Michaels M, Shera D, Berkowitz R, Fisler R, Saxe G: Fluoxetine in posttraumatic stress disorder. *J Clin Psychiatry 1*994; 55(12): 517-22.

[121] Hertzberg MA, Feldman ME, Beckham JC, Kudler HS, Davidson JR: Lack of efficacy for fluoxetine in PTSD: a placebo controlled trial in combat veterans. *Ann Clin Psychiatry* 2000; 12(2): 101-5.

[122] Zohar J, Amital D, Miodownik C, Kotler M, Bleich A, Lane RM, Austin C: Double-blind placebo-controlled pilot study of sertraline in military veterans with posttraumatic stress disorder. *J Clin Psychopharmacol* 2002; 22(2): 190-5.

[123] Asnis GM, Kohn SR, Henderson M, Brown NL: SSRIs versus non-SSRIs in post-traumatic stress disorder: an update with recommendations. *Drugs* 2004; 64(4): 383-404.

[124] Martenyi F, Brown EB, Zhang H, Prakash A, Koke SC: Fluoxetine versus placebo in posttraumatic stress disorder *J Clin Psychiatry* 2002; 63(3): 199-206.

[125] Gibbons RD, Brown CH, Hur K, Marcus SM, Bhaumik DK, Mann JJ: Relationship Between Antidepressants and Suicide Attempts: An Analysis of the Veterans Health Administration Data Sets *Am J Psychiatry* 2007; 164: 1044–1049.

[126] Hageman I, Andersen HS, Jørgensen MB: Post-traumatic stress disorder: a review of psychobiology and pharmacotherapy. *Acta Psychiatr Scand* 2001; 104: 411–422.

[127] Wolf ME, Alavi A, Mosnaim AD: Posttraumatic stress disorder in Vietnam veterans clinical and EEG findings; possible therapeutic effects of carbamazepine. *Biol Psychiatry* 1988 ; 23: 642-4.

[128] Lipper S, Davidson JR, Grady TA, Edinger JD, Hammett EB, Mahorney SL, et al: Preliminary study of carbamazepine in post-traumatic stress disorder. *Psychosomatics* 1986; 27: 849- 54.

[129] (kozaric-kovacic 2006.) Pivac N, Kozarić-Kovačić D: Pharmacotherapy of Treatment-resistant Combat-related Posttraumatic Stress Disorder with Psychotic Features. *Croat Med J* 2006; 47(3): 440–451.

[130] Friedman MJ: Post-Vietnam syndrome; recognition and management. *Psychosomatics* 1981; 22: 931–943.

[131] Ford JD, Greaves D, Chandler P, Thacker B, Shaw D, Sennhauser S, Schwartz L: Time-Limited Psychotherapy with Operation Desert Storm Veterans. *Journal of Traumatic Stress* 1997; 10: 4.

[132] Ready DJ, Thomas KR, Worley V, Backscheider AG, Harvey LAC, Baltzell D, Rothbaum BO: A Field Test of Group Based Exposure Therapy With 102 Veterans With War-Related Posttraumatic Stress Disorder. *Journal of Traumatic Stress* 2008; 21: 2.

[133] Valentino P. Esercito, Dopo il Vietnam mai tanti casi fra i militari Usa. L'accademia dei cadetti suicidi, Team d'emergenza a West Point. *Corriere della Sera* 02.02.2009.

[134] Todd Yosick M: *Prevention of Suicide in the United States Army*. In: Lowering suicide risk in returning troops. B.K Wiederhold (Ed); IOS press 2008: 98-101

[135] Bryant RA: An Analysis of Calls to a Vietnam Veterans' Telephone Counselling Service. *Journal of Traumatic Stress* 1998; 11: 3.

[136] Bryant, RA, Harvey AG: Psychological impairment following motor vehicle accidents. *Australian Journal of Public Health* 1995; 19: 185-188.

[137] Schwarz ED, Kowalski JM, McNally RJ: Malignant memories: Post-traumatic changes in memory in adults after a school shooting. *Journal of Traumatic Stress* 1993; 6: 545-553.

[138] Fikretoglu D, Brunet A, Schmitz N, Guay S, Pedlar D: Posttraumatic Stress Disorder and Treatment Seeking in a Nationally Representative Canadian Military Sample. *Journal of Traumatic Stress* 2006; 19: (6) 847–858.

[139] Gould M, Greenberg N, Hetherton J: Stigma and the Military: Evaluation of a PTSD Psychoeducational Program. *Journal of Traumatic Stress* 2007; 20(4):505–515.

[140] Schulze B, Angermeyer MC: Subjective experiences of stigma. A focus group study of schizophrenic patients, their relatives and mental health professionals. *Social Sciences and Medicine* 2003; 56: 299–312.

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 10

MEDICALIZATION OF DISTRESS: PROS AND CONS

Edith van't Hof and Dan J. Stein
University of Cape Town, Rondebosch, South Africa

ABSTRACT

Discussion of post-traumatic stress disorder (PTSD) dominates the current literature on psychopathology related to conflict. Nevertheless, much controversy exists regarding the responses to traumatic experiences and the PTSD diagnosis. Proponents of the diagnosis regard symptoms of PTSD as psychopathological consequences of a trauma. On the other hand, critics view PTSD as 'invented' by socio-political processes, a way of medicalizing distress after traumatic events. In this chapter we put forward an integrative view which emphasizes that there have been significant advances in understanding and treating PTSD, but which also notes that not all psychological distress after trauma should be termed post traumatic stress disorder. There are benefits in focussing on resilience during and after traumatic events, but at the same time a balanced perspective is needed to ensure compassion to those who require care for their symptoms.

INTRODUCTION

At the turn of the 21st century our world is plagued by an escalation in political violence, ethnic conflicts and wars. In the twentieth and twenty-first centuries small scale conflicts have been replaced by larger scale ones and many parts of the world are affected by this amplification. Besides the two world wars, there have been civil wars, inter-ethnic strife, political repression, genocide and ethnic cleansing. The World Mental Health report indicates that the numerous low-intensity wars, such as the ones that have been affecting different parts of Africa, Latin America and Asia for many years now, are a cause of considerable distress at a population level, affecting both civilians and soldiers (1).

The negative effects of wars and conflicts on the collective health status and well-being of affected populations are extensive. Wars and conflicts reach beyond the commonly seen physical devastation of property and people; they affect structures of communities within a society. Affected people are often witnessing the breakdown of their social world, which

represents their history, their identity and their value systems. The individual effects of war found amongst different populations in both civilians and soldiers differ with respect to time and place (2). Experiences of distress in war and conflict situations may lead to a range of symptoms in affected populations such as headaches, non-specific pains or discomfort in torso and limbs, dizziness, weakness, and fatigue (3).

Most research conducted in this field has focussed on the impact of warfare on combatants, but in the past two decades more emphasis has been placed on the evaluation of civilians in war-stricken areas. Literature focussing on long-term effects of war has attempted to establish direct linkages between the preceding experience of trauma and the persistence of certain symptoms in affected individuals. These effects are typically interpreted as anxiety, depression, drug and alcohol abuse and post-traumatic stress disorder (PTSD), with the latter concept dominating the current literature on psychopathology associated with conflict. Nevertheless, there is a good deal of controvery about this diagnosis.

On the one hand, advocates of the medical model regard trauma as an abnormality, accordingly using medical terminology to describe a subsequent disorder. In the past, trauma has been regarded as a rare event that was not part of the normal range of human experience. Thus, the psychological effects of trauma were regarded as an understandable response to an abnormal event. However, a medical perspective increasingly emphasizes that exposure to trauma is highly prevalent, with post-traumatic distress a common consequence of a trauma, and with a persistent pathological response - or post-traumatic stress disorder - a less common but potentially important consequence (4).

On the other hand, critics of the PTSD construct object to the increasing medicalisation of distress after conflict, and raise doubts about the validity of the diagnosis of PTSD (2,5). They argue that symptoms of distress do not necessarily represent psychopathology, and they blame the 'invention' of PTSD on sociopolitical processes including a culture of compensation (2). Summerfield (6,7), Young (14), and several other authors reminds us that humans use different mechanisms for coping with traumatic experiences, and that the resilience of individuals should receive adequate attention in order to understand the traumatic experience in its entirety.

This chapter reviews developments in post-traumatic stress disorder from the medical and socio-political perspectives. If PTSD is considered a medical condition, one may envisage the need for training of health professionals to ensure suitable assessment, diagnosis and treatment of patients. On the other hand, if the distress experienced after trauma is considered understandable instead of pathological, clinicians working in this field should acknowledge the socio-political contexts influencing the origins of distress. An attempt is made to acknowledge both the advantages and disadvantages of medicalizing stress responses. An integrative approach is used to create a synthesis of the two models that incorporates the advantages of both.

MEDICALIZATION AND PTSD

A biomedical view may note that the boundary between normality and abnormality is difficult to define. The DSM-IV-TR (8) states " …it must be admitted that no definition adequately specifies boundaries for the concept 'mental disorder'". Later it says '…each of

the mental disorders is conceptualized as a clinical significant behavioural or psychological syndrome or pattern that occurs in an individual and that is associated with present distress or disability' (DSM-IV-TR page xxx-xxxi). There are no specific guidelines available explaining how to separate pathological states from painful non-pathological states, although the DSM emphasizes the concepts of distress and impairment in making this decision.

Most of the criticism expressed by protestors of the PTSD diagnosis is focused on the notion of 'medicalization' of distress and the overextention of psychiatry's reach. The term 'medicalization' was introduced and developed by philosophers and sociologists of medicine to describe how a range of different phenomena become seen as 'disorders' that require 'therapy' (9). The term is usually used in a critical way to express the inappropriateness of the extension of medical discourse. The biotechnological companies, consumers and managed care are believed to maintain and support the medicalization process (10).

Of all the clinical disciplines, psychiatry is the one most often criticized for overextending its grasp. Some authors belief this is due to the "dumping" of individuals on psychiatry and the lack of clear definitions of its domain. (11). In this view, psychiatry serves as a form of social control that helps to manage some of society's most "difficult" individuals, and is expected to provide relief when individuals have distress due to social consequences. Medicalization of psychiatric symptoms is often called 'psychiatrization' (12). Some critics say that western society expects psychiatrists to deal with different forms of distress for which it lacks a theoretical framework and a demonstrated practical capacity (11).

Domains within psychiatry that seem particularly contested are those involving trauma and violence. It has been argued that medicalization repackages particular forms of distress as medical disorders. According to critics, distress is most often misdiagnosed as major depressive disorder, PTSD and suicide (11). Western models of 'traumatization' and 'recovery' are often commented upon as being inappropriately applied (13). Constructs such as PTSD are seen as peculiarly Western and the prescribed 'talk therapies' and medication as inappropriate in situations where problems are moral rather than medical (13). It is argued that PTSD is not a valid medical entity and the language around PTSD should be radically changed (2,14).

The first reports of disorders following a war experience date back to the American Civil War (1861-1865). The physician Jacob Mendez Da Costa outlined how veterans developed a rapid heart rate after being in a violent conflict. The condition was called 'Da Costa's heart' and did not fully acknowledge the psychiatric aspects (15). The negative mental effects of war were recognized during World War One (1914-1918) in the diagnosis of 'shell shock'. One of the theories for this diagnosis involved the possibility that powerful explosions propelled minute metal fragments into the heads of combatants (14). Ideas on the involvement of psychological factors started during the Second World War, with the disorder called "war neurosis" described by Freud (14). PTSD was first described in United States soldiers and allied veterans during the Vietnam war (1965-1973), and was included in the DSM-III in 1980 (14).

The initial definition of PTSD in the third edition of the DSM emphasized that a traumatic event consisted of 'a recognizable stressor that would evoke significant symptoms of distress in almost everyone' and was 'outside the range of normal human experience'. For this purpose, many different types of traumatic events have been studied including both military and civilian events. The DSM III R, published in 1987, expanded the definition of a traumatic stressor; experiencing a threat to one's life or bodily integrity, receiving severe

and/or intentional physical harm or injury, being exposed to the grotesque, experiencing the violent or sudden lost of a loved one, witnessing or learning of violence against a loved one, learning of exposure to a noxious agent, and causing death or severe harm to another person. In DSM-IV, it was suggested that defining events in purely objective terms is problematic, and both objective characteristics of a traumatic event (e.g. actual death, threatening death or serious injury) and reactions produced by such events (e.g. intense fear, intense helplessness, or intense horror) were used to define a trauma.

MEDICAL VIEW

Proponents of the PTSD diagnosis view the disorder as an abnormal response to a traumatic event that needs subsequent treatment. Experiencing a traumatic event is rather common, but developing a subsequent post-traumatic stress disorder is relatively uncommon (16). Research has indicated that approximately 70-80% of people have a traumatic experience over the course of their lifetimes (17), but only a minority will eventually develop PTSD. The severity of the trauma influences the chances of developing a disorder (15). Not all people develop the disorder after a traumatic experience, and specific variables exist that predict the development of PTSD. These factors vary from those that already exist before the trauma (e.g. genetic vulnerability), variables during the trauma (e.g. severity and duration of trauma) and those present after the trauma (e.g. social support) (18,19).

In present psychiatric publications the most predominant view is that post-traumatic stress disorder (PTSD) is a medical disorder characterized by a psychobiological dysfunction. Several circuits are currently regarded as involved in the pathophysiology of PTSD, based on findings from animal research and functional brain imaging studies, with medial prefrontal cortex (20), amygdala (15,21), and several other regions (22,23) playing an important role. The most consistent finding from brain imaging studies is decreased hippocampus volume in PTSD patients (24). Various explanations can be given for this finding, for example, the damage and volume reduction may be the result of stress (25). Alternatively it is possible that the smaller hippocampus volume predisposes to PTSD (26).

Several different neurochemical systems are located within this neurocircuitry. It has been suggested that neurobiological systems are sensitized over time by traumatic stress and as a result contribute to PTSD symptoms. Such systems include the Locus Coeruleus (LC)/ Norepinephrine (NE) system and the Cortisol Releasing Factor (CRF)/ Hypothalamic-Pituitary-Adrenal (HPA) axis (15). A broad range of other systems, including the serotonin and dopamine systems, and a range of neuropeptide systems, may also play a role in the pathophysiology of PTSD (27).

A growing evidence base shows that pharmacotherapy and psychotherapy are safe and can diminish symptoms of PTSD and reduce associated disability (28,29). Such interventions might well reverse the postulated psychobiological dysfunctions in the disorder, reducing the sensitivity of glucocorticoid receptors, increasing the volume of the hippocampus, and decreasing overactive temperolimbic activity (30). A range of new therapeutic targets may ultimately prove useful in the treatment of PTSD; these include CRF-antagonists, antiadrenergic compounds, antikindling/antisentization anticonsulvants, modulators of

NMDA, neuropeptide Y enhancers and drugs that down-regulate glucocorticoid receptors (15).

The medical model of PTSD has possible advantages. First, the model provides a framework for understanding the pathogenesis of PTSD and other stress related diagnoses. Secondly, the model is useful insofar as it encourages the development and dissemination of pharmacological and psychological treatment approaches for PTSD. Since under-diagnosis and under-treatment of PTSD (31) and issues of stigma around the diagnosis are not uncommon, it is logical to stimulate awareness and management of the disorder. Such an approach is especially relevant bearing in mind that effective and safe treatments are available for PTSD (32).

The disadvantage of a purely medical model of distress is that one might consider trauma responses as entirely universal and fixed. This may increase the chance of ignoring the influence of society on the subjective experience of trauma and the expression of subsequent symptoms (33). In addition, when focussing on psychobiological dysfunction, the possibility exists that attention is diverged away from important socio-political issues associated with traumatic events. Some critics assume that western models of diseases and healing are valid across cultures, while others see harm in this idea (34,35,36). Such different beliefs obviously result in controversy when developing mental health care programmes in non-western countries. A purely psychobiological approach may not only decrease socio-political efforts to prevent violence, but may also result in fewer efforts to develop effective non-medical interventions intended to relieve distress after traumatic events. It can also make us prone to forget that after disasters (natural or human induced) the most appropriate aids are practical (provide safety, reunite families, shelter, food) rather than emotional (37).

SOCIO-POLITICAL VIEW

Much scepticism exists about PTSD as a medical diagnosis. First of all, historians and anthropologists have pointed out that responses to and symptoms of trauma are likely to change over time and space. Jones and co-workers (38) reported that, after reviewing medical and military histories of British servicemen since 1872, post-combat symptoms typically occur with variations on a theme and never as a single response. The authors identified three varieties of disorder during different war time-frames, suggesting that these time-frames are the best predictors of post-combat disorder. For example, the ‘debility syndrome’ is associated with the 19th and early 20th centuries, the ‘somatic syndrome’ primarily related to the First World War, and the ‘neuropsychiatric syndrome’ is linked with the Second World War and the Gulf conflict. Using the same data the authors suggested that the ‘flashback’, which is a present-day sign of PTSD, was not present in the earlier narratives (39). Work published by Marsella and colleagues (40) indicated that re-experiencing and hyper-arousal symptoms of PTSD are universal. On the other hand symptoms of avoidant behaviour and numbed emotions may be more likely to be found in particular cultural contexts where they are an idiom of distress (40).

Many of those who critique the diagnosis of PTSD are proponents of the socio-political model of PTSD. They are inclined to consider PTSD as a socially constructed entity, established for specific socio-political reasons. In the socio-political view PTSD arose as

much from socio-political ideas as from medical ones, reflecting a cultural trend that has gathered pace during the past century. Young (14) claims that PTSD was invented in 1980 in the USA to address the social crisis caused by the Vietnam war. The strong connection with compensation-seeking behaviour is still one of the reasons the diagnosis is so controversial. The practice of providing compensation for veterans with PTSD is under review in the United States. In 2005, the US Department of Veterans Affairs and Veterans Benefits Administration began a review of claims after it noted a reported 30% increase in PTSD claims in recent years. The review was started because of the negative effect on the budget and the apparent inconsistency in compensation benefits. As benefits often serve as the only source of income for veterans, the review resulted in a broad political backlash from veterans' rights groups and coincided with some highly publicized suicides by veterans who feared loss of their benefits. In response to these events, in 2005, the Secretary of the US Department of Veterans affairs announced that "the Department of Veterans Affairs (VA) will not review the files of 72,000 veterans currently receiving disability compensation for post-traumatic stress disorder..."

Along the same lines, many have argued that PTSD as a diagnosis lacks specificity and claim that it is imprecise in differentiating between the physiology of normal and pathological distress (2). After all, between 70 and 80 percent of people will experience a traumatic event over the course of a lifetime, like physical assault, sexual assaults, accidents, disasters, warfare (17). It is normal for people to experience mental distress after a trauma, and according to Norris (2003) and Rothbaum (1993) 95% of survivors experience distress afterwards, and such symptoms do not necessarily indicate psychopathology. Field suggests that the symptoms normally fade away over time and that the litigation which people are involved in might keep them alive (41). Sceptics of the medical view argue that the 'invention' of PTSD has created a society in which being the 'victim' is socially more beneficial than being a 'survivor'. In this context it is more tempting for people to present themselves as medicalized victims rather than to portray themselves as survivors.

The idea that PTSD is associated with trauma and subsequent specific neurobiological deficits is often criticized in research publications. Frueh (42) and co-workers have reported that some of the people receiving PTSD treatment after warfare have never actually experienced real combat. Some of the neurochemical and neuroanatomical deviations typical for PTSD are also evident in different neuropsychiatric disorders. Likewise, selective serotonin re-uptake inhibitors (SSRI's) may be successful in managing PTSD, but are also effective in other psychiatric disorders such as depression and anxiety. In addition, some critics argue that PTSD is not a separate disorder but merely a collection of psychological reactions that may occur after a traumatic experience (41).

The socio-political model, focussing on the social context of trauma has both advantages and disadvantages. In the framework of this model, trauma does cause distress, but not all distress is considered pathological. Much emphasis is given to resilience in the socio-political model. The socio-cultural context and narratives of societies play a part in framing our experiences and expression of distress (43). Too much focus on disorders can create a 'paradox of health'. An increase in consciousness of health in populations will lead to greater self-observations, awareness of symptoms and experiences of illness. This gives rise to a paradoxical phenomenon whereby informed healthy populations complain more about their health than unhealthy uninformed populations (44).

The socio-political model may, however, underestimate the universality of particular symptoms in PTSD, and of their underlying psychobiological mechanisms. Downplaying the

symptoms of PTSD, and their relevant psychobiological disruptions, may contribute to the underdiagnosis and undertreatment of patients with this condition. Socio-political processes may play a role in determining how PTSD is experienced, but an emphasis on psychobiological mechanisms does not necessarily imply that efforts to prevent trauma and to provide non-medical intervention for distress are not also crucially important.

INTEGRATION OF MEDICAL AND SOCIO-POLITICAL MODELS

Both medicine and psychiatry are deeply rooted in both the natural sciences (i.e. focusing on biological mechanisms and their consequences) as well as the humanities (i.e. focusing on doctor-patient relationship and patients' experiences). In his book 'Rethinking Psychiatry' Kleinman makes a distinction between the terminology of "*illness*" and "*disease*" (45). The term *disease* indicates the malfunction of biological or psychological processes, while *illness* refers to the psychosocial experience of the patient's symptoms and the meaning of the perceived disease. In a similar way, responses to trauma can be evaluated from the interdisciplinary approach of the 'medical humanities'. Here both the underlying psychobiological malfunctions and the psychosocial context in which the response to trauma arises are acknowledged.

On the one hand, for example, there is a need to know which medications can be used to treat PTSD. Basic lessons on the neurobiology of PTSD provide a basis for understanding pharmacological prophylaxis and intervention (46,47). On the other hand, however, the socio-political context in which a trauma occurs should be emphasised. This context has its impact on both the actual experience of the trauma and the experience of subsequent symptoms. Social and cultural factors determine the way people experience events, including the determination of what counts as a traumatic event and what not. In addition, the context helps determine what can be considered an abnormal or normal response to a trauma. As is arguably the case for all psychiatric disorders, PTSD is culture bound.

In addressing distress after violent conflict, the focus should be both on the mechanisms and the meanings of a consequent disorder such as PTSD. It needs to be acknowledged that distress after traumatic experiences is normal and that a range of symptoms and disorders can occur, which may include symptoms and disorders associated with PTSD. Effective interventions should be available for people suffering from these symptoms. Simultaneously, where possible, one should avoid medicalization of all distress after traumatic events. Overemphasis on preventive techniques like 'critical incident stress debriefing' (CISD) and other psychological debriefing has brought about a misuse of resources (48). Literature has indicated that debriefing has been proven ineffective (49,50,51) and some studies show that debriefing can even be harmful (52,53). In addition, effective treatment is often not being delivered to people in need (48). Furthermore, there are indications that the practice of particular cultural narratives and rituals in certain populations could play a part in preventing the development of PTSD (43).

The oppressive racist system of *apartheid* in South Africa made non-white people and all its other opponents subject to humiliation, social and economic discrimination, forced relocation, torturing, killings or simply 'disappearances'. The Truth and Reconciliation Commission (TRC) established by the post-Apartheid regime is a good example of how the

two models of PTSD can be integrated. The TRC used medical metaphors declaring that to 'heal' the nation, 'wounds' suffered in the past should be exposed. At the same time, the TRC emphasized the use of non-medical metaphors and perspectives and focused on the resilience of people who took part in the struggle against the apartheid regime. Literature has shown that the ideological commitment of participants in violent conflicts is a defining factor for the distress symptoms that are being expressed. Ideologically committed individuals are less likely to complain about stress-related symptoms than people who are not ideological committed (54,55).

Providing a TRC to survivors was embedded in a medical model, thus meeting society's obligation to compensate the sufferers of traumatic experiences. On the other hand, the focus on forgiveness was expressed through the idea that acknowledgment of the trauma was more important than actual retributive justice. The integration of these two approaches and the emphasis on resilience made the TRC an example of how to address mass trauma through a social model (56,57). At the same time, no correlation in the improvement of individuals' psychological symptoms could be found for individuals participating in the TRC versus those who did not participate (56). Thus, the TRC required to be supplemented with medical care for those with PTSD and other psychiatric disorders.

An integrated model may also be useful in other contexts, such as the military. Jobs in the army differ substantially from civilian ones in terms of the amount of exposure to risk and danger. It can be assumed that soldiers, whose daily jobs expose them to frequent danger, are less likely to develop PTSD than soldiers who cross paths with traumatic events unintentionally or by mistake. One study (58) even reports a modest bettering in mental health of elite British soldiers who participated in the invasion of Iraq, instead of increased PTSD. It is possible though that veterans may experience post-traumatic symptoms at a later date, for example, feeling dissatisfied once a new regime comes into place (59).

Illustrations of the distinction between traumatic memories and a psychiatric disorder can also be derived from the armed services. Most US World War II combat veterans never ceased to forget their exposure to combat and continued to have, often distressingly so, dreams and memories of conflict situations. Very few veterans actually developed a disorder, and with those who did, it was associated with pre-service variables. People exposed to combat were actually found more likely to be high achievers in their later careers compared to people who were not in the army (60). On the other hand, the SSRI's introduced some years later did in fact help some World War II veterans who suffered from PTSD symptoms (61).

One can also use an integrated approach when looking at more recent events causing distress in various populations, e.g. terror attacks (9/11, Madrid, Bombay) and natural disasters (tsunami, earthquakes) (62,63). While it may be important to be aware of the possibility of psychiatric disorders developing in the aftermath of such traumas, it is perhaps even more crucial to focus on practical issues such as providing safety and information. In addition, it is important to emphasize the resilience of communities; although traumas may lead to significant disruptions, there may also be significant social capital which allows a gradual adjustment (64,65).

An integrative model provides the opportunity to view PTSD after a traumatic experience as both a medical condition and a political construct. Combining the advantages of the models, the psychobiological mechanism can be acknowledged with the resulting symptoms, while at the same time incorporating the social context wherein the trauma occurs. In clinical and social practice we need to make sure that there is a balanced way of helping distressed

people after violent events. People need to be properly diagnosed and treated, but sufficient space for narratives is also needed to acknowledge people's resilience and to ensure that distress after trauma is seen as a normal process (66,67).

CONCLUSION

Clinicians and society in general face a challenge to develop guidelines and tools to effectively evaluate responses to traumatic and violent events. A fine balance needs to be achieved in accentuating both heroism and resilience, but at the same time being compassionate to those who do not cope well and to make sure that they are taken care of. Societies always did and always will produce both heroes, who are defined by what they have done, and victims, who will be defined in terms of what is being done to or for them. There is a fine line between respecting, promoting courage and stigmatizing breakdown. One wants to reward bravery and resilience, but at the same time compensate and look after victims. World War II witnessed an aversion to medicalizing responses to trauma, which resulted in so-called pitiless psychology. After the Vietnam War on the other hand, distress was treated with capacious medicalisation which according to some was taken too far (68,69).

When discussing medicalization of distress, one needs to remember that the experience of traumatic events and its consequent symptoms differ from time and place. Not all expressions of distress after trauma indicate psychopathology or posttraumatic stress disorder. Critiques of the process of 'medicalization' in medicine and psychiatry need to be taken seriously. After trauma, medicalization has important limits, and there is a great deal of value in focussing on resilience. However, much critique of 'medicalization' seems to be prone to conceptual problems and has its own limitations. The medicalization of distress has brought forward a growing understanding of pathogenesis and the ability to reduce the symptoms of PTSD.

A view of medicine and psychiatry that overly emphasizes 'medicalization' and inappropriate diagnoses can be as incomplete an approach as one which objectifies disorders and uses reductionistic interventions. Clinicians should strive to find a balance in practice when dealing with PTSD. For every new patient both the relevant 'diseases' and 'illnesses' should be acknowledged. The situation in practice calls for the assessment of the potential psychobiological aetiology underlying the event, while at the same time considering the person's experience of the symptoms. In this regard, the medicalization of distress can be seen as a starting point for treatment rather than its aim (70,71,72).

REFERENCES

[1] Desjarlais R, Eisenberg L, Good B, Kleinman A: World Mental Health. Oxford, Oxford University Press, 1995.

[2] Summerfield D: The invention of post-traumatic stress disorder and the social usefulness of a psychiatric category. BMJ 2001; 322: 95-98.

[3] Summerfield D: War and mental health: a brief overview. BMJ 2000; 321: 232-235.

[4] Yehuda R: Conflict between current knowledge about posttraumatic stress disorder and its original conceptual basis. American Journal of Psychiatry 1995; 152: 1705-1713.

[5] Bracken PJ: Trauma: Culture, meaning, and philosophy. London, Whurr Publishers, 2002.
[6] Summerfield D: Addressing human responses to war and atrocity, in Beyond Trauma: Cultural and societal dynamics. Edited by Kleber RJ, Figley CR, and Gersons BPR. New York, Plenum Press, 1995.
[7] Summerfield D: The psychological legacy of war and atrocity: The question of long term and transgenerational effects and the need for a broad view. Journal of Nervous and Mental Disease 1996; 184: 375-377.
[8] American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders. Washington, DC, American Psychiatric Association, 2000.
[9] Conrad P, Schneider J: Deviance and Medicalization: From Badness to Sickness. St Louis, Mosby, 1980.
[10] Conrad P: The shifting engines of medicalisation. Journal of Health and Social Behavior 2005; 46: 3-14.
[11] Pridmore S: medicalization/psychiatricization of distress, in Download of Psychiatry. University of Tasmania, 2008, pp 1-13.
[12] Knezevic M, Jovancevic M: Model of providing psycho-social aid to refugees and displaced persons: records of the Croatian Psychiatric Association. European Journal of Psychiatry 2001; 15: 33-47.
[13] Summerfield D: Effects of war: moral knowledge, revenge, reconciliation, and medicalised concepts of 'recovery'. BMJ 2002; 325: 1105-1107.
[14] Young A: The harmony of illusions: inventing post-traumatic stress disorder. Princetown, New Yersey, Princetown University Press, 1995.
[15] Vermetten E, Bremner JD: Circuits and systems in stress. II Applications to neurobiology and treatment in posttraumatic stress disorder. Depression and Anxiety 2002; 16: 14-38.
[16] Kessler RC, Sonnega A, Bromet E: Posttraumatic stress disorder in the National Comorbidity Survey. Archives of General Psychiatry 1995; 52: 1048-1060.
[17] Resick PA: Stress and trauma. Hove, Psychology Press, 2001.
[18] Yehuda R: Risk and resilience in posttraumatic stress disorder. J Clin Psychiatry 2004; 65S1: 29-36.
[19] Brewin CR, Andrews B, Valentine JD: Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. J Consult Clin Psychol 2000; 68: 748-766.
[20] Morgan MA, LeDoux JE: Differential contribution of dorsal and ventral prefrontal cortex to the acquisition and extinction of conditioned fears in rats. Behavioral Neuroscience 1995; 109: 681-688.
[21] Pitman RK, Shin LM, Rauch SL: Investigating the pathogeniesis of Posttraumatic Stress Disorder with neuroimaging. Journal of Clinical Psychiatry 2001; 62: 47-54.
[22] Shin LM, McNally RJ, Kosslyn SM, Thompson WL, Rauch SL, Alpert NM, Metzger LJ, Lasko NB, Orr SP, Pitman RK: A positron emission tomographic study of symptoms provocation in PTSD. Annals of the New York Academy of Sciences 1997; 821: 521-523.
[23] Lindauer RJ, Booij J, Habraken JB, Uylings HB, Olff M, Carlier IV, den Heeten GJ, van Eck-Smit BL, Gersons BPR: Cerebral blood flow changes during script-driven imagery in police officers with posttraumatic stress disorder. Biological Psychiatry 2004; 56: 853-861.

[24] Kitayama N, Vaccarino V, Kutner M, Weiss P, Bremner JD: Magnetic resonance imaging (MRI) measurement of hippocampal volume in posttraumatic stress disorder: A meta-analysis. Journal of Affective Disorders 2005; 88: 79-86.

[25] McEwen BS, Conrad CD, Kuroda Y, Frankfurt M, Magarinos AM, McKittrick: Prevention of stress-induced morphological and cognitive consequences. European Neuropsychopharmacology 1997; 7: 322-328.

[26] Gilbertson MW, Shenton ME, Ciszewski A, Kasai K, Lasko NB, Orr SP, Pitman RK: Smaller hippocampal volume predicts pathologic vulnerability to psychological trauma. Nature Neuroscience 2002; 5: 1242-1247.

[27] Nemeroff, CB, Bremner JD, Foa EB, Mayberg HS, North CS, Stein MB: Posttraumatic stress disorder: a state-of-the-science review. Journal of Psychiatric Research 2006; 40: 1-21.

[28] Stein DJ, Ipser J, Seedat S: Pharmacotherapy for post-traumatic stress disorder. Cochrane Database Systematic Review 2006; Issue 1. Art. No.: CD002795. DOI: 10.1002/14651858.CD002795.pub2.

[29] Bradley R, Greene J, Russ E, Dutra L, Westen DA: Multidimensional meta-analysis of psychotherapy for PTSD. American Journal of Psychiatry 2005; 162: 214-227.

[30] Seedat S, Warwick J, van Heerden B, Hugo C, Zungu-Dirwayi N, van Kradenburg J, Stein DJ: Single photon emission computed tomography in posttraumatic stress disorder before and after treatment with selective serotonin reuptake inhibitor. Journal of Affective Disorders 2004; 80: 45-53.

[31] WHO World Mental Health Survey Consortium: Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. JAMA 2004; 291: 2581-2590.

[32] Ballenger JC, Davidson JR, Lecrubier Y, Nutt DJ, Foa FB, Kessler RC, McFarlane AC, Shalev AY: Consensus statement on posttraumatic stress disorder from the International Consensus Group on Depression and Anxiety. J Clin Psychiatry 2000; 61S5: 60-66.

[33] Stein DJ, Williams D: Cross-cultural aspects of anxiety disorders, in Textbook of Anxiety Disorders. Edited by Stein, D. J. and Hollander E. Washington DC, American Psychiatric Publishing, 2001.

[34] de Vries F: To make a drama out of trauma is fully justified. Lancet 1998; 351: 1579-1580.

[35] Dyregrov A, Gupta L, Gjestad R, Raundalen M: Is culture always rigth? Traumatology 2002; 8: 1-10.

[36] Mezey G, Robbins I: Usefulness and validity of posttraumatic stress disorder as a psychiatric category. BMJ 2001; 323: 561-563.

[37] van Ommeren M, Saxena S, Saraceno B: Mental and social health during and after acute emergencies: emerging consensus? Bull World Health Organ 2005; 83: 71-75.

[38] Jones E, Hodgins-Vermaas, McCartney H, Everitt B, Beech C, Poynter D, Palmer I, Hyams K, Wessely S: Post-combat syndromes from the Boer war to the Gulf war: a clster analysis of their nature and attribution. BMJ 2002; 324: 321-324.

[39] Jones E, Vermaas RH, McCartney H, Beech C, Palmer I, Hyams K, Wessels S: Flashbacks and post-traumatic stress disorder: the genesis of a 20th century diagnosis. British Journal of Psychiatry 2003; 182: 158-163.

[40] Marsella AJ, Friedman MJ, Gerritse ET, Scurfield RM: Ethnocultural aspects of PTSD:some closing thoughts, in Ethnocultural aspects of posttraumatic stress disorder:

issues, research, and clinical applications. Edited by Marsella AJ, Friedman MJ, Gerritse ET, and Scurfield RM. Washington DC, American Psychological Association,1996.

[41] Field LH: Post-traumatic stress disorder: A reappraisal. Journal of the Royal Society of Medicine 1999; 92: 35-37.

[42] Frueh B, Elhia J, Grubaugh A, Monnier J, Kashdan TB, Sauvageot JA, Hamner MB, Burkett BG, Arana GW: Documented combat exposure of veterans seeking treatment for combat related posttraumatic stress disorder: review of records from US National Personnel Records Center. British Journal of Psychiatry 2005; 186: 467-472.

[43] Shay J: Archilles in Vietnam: Combat trauma and the undoing of character. New York, Touchstone, 1995.

[44] Barsky AJ: The paradox of health. N Eng J Med 2005; 318: 414-418.

[45] Kleinman A: Rethinking Psychiatry: from cultural category to personal experience. New York, Free Press, 1998.

[46] Charney DS: Psychobiological mechanisms of resilience and vulnerability: implications for succesful adaptation to extreme stress. American Journal of Psychiatry 2004; 161: 195-216.

[47] Pitman RK, Sanders KM, Zusman RM, et al: Pilot study of secondary prevention of posttraumatic stress disorder with propranolol. Biological Psychiatry 2002; 51: 189-192.

[48] Brewin RB: Post-traumatic Stress Disorder: Malady or Myth. New Haven & London, Yale University Press, 2003.

[49] Rose S, Bisson J, Wessely S: A systematic review of single-session psychological interventions ('debriefing') after trauma. Psychother Psychosom 2003; 72: 176-184.

[50] Rose S, Bisson J, Churcill R, Wessely S: Psychological debriefing for preventing post-traumatic stress disorder. Cochrane Database Systematic Review 2002; Issue 2. Art. No.: CD000560. DOI: 10.1002/14651858.CD000560

[51] Bisson J, McFarlane AC, Rose S: Psychological debriefing, in Effective treatments for PTSD. Edited by Foa EB, Keane TM, and Friedman MJ. New York, Guilford, 2000.

[52] Mayou RA, Ehlers A, Hobbs M: Psychological debriefing for road accident victims: Three-year follow-up of a randomised controlled trial. British Journal of Psychiatry 2000; 176: 589-593.

[53] Bisson J, Jenkins PL, Alexander J, Bannister C: Randomized controlled trial of psychological debriefing for victims of acute burn trauma. British Journal of Psychiatry 1997; 171: 78-81.

[54] Basoglu M, Mineka S, Paker M, Aker T, Livanou M, Gok S: Psychological preparedness for trauma as a protective factor in survivors of torture. Psychol Med 1997; 27: 1421-1433.

[55] Kaplan Z, Matar MA, Kamin R, Sadan T, Cohen H: Stress-related responses after 3 years of exposure to terror in Israel: are ideological-religious factors associated with resilience? J Clin Psychiatry 2005; 66: 1146-1154.

[56] Kaminer D, Stein DJ, Mbanga I, Zungu-Dirwayi N: The Truth and Reconciliation Commission (TRC) in South Africa: Relation to psychiatric status and forgiveness among survivors of human rights abuses. British Journal of Psychiatry 2001; 178: 373-377.

[57] Stein DJ: Psychiatric aspects of the Truth and Reconciliation Commission in South Africa. British Journal of Psychiatry 1998; 173: 455-458.
[58] Hughes HJ, Cameron F, Eldridge R, Devon M, Greenberg N, Wessely S: Going to war can be good for you: deployment to war in Iraq is associated with improved mental health for UK personnel. British Journal of Psychiatry 2005; 186: 536-537.
[59] Emsley RA, Seedat S, Stein DJ: Posttraumatic stress disorder and occupational disability in South African security force members. J Nerv Ment Dis 2003; 191: 237-241.
[60] Lee K, Vaillant G, Torrey W, Elders G: A 50-year prospective study of the psychological sequelae of World War II combat. American Journal of Psychiatry 1995; 152: 516-522.
[61] de Boer A, op van Velde W, Falger PJ, Hovens JE, de Groen JH, van Duijn H: Fluvoxamine treatment for chronic PTSD: a pilot study. Psychother Psychosom 1992; 57: 158-163.
[62] The Lancet: 9/11 one year on: bridging the world's divisions. Lancet 2002; 360: 729.
[63] Cheng MH: Post-tsunami boost to southeast Asia's mental health care. Lancet 2006; 367: 15-17.
[64] Neria Y, Marshall R, Susser E: Mental Health in the wake of a terrorist attack. New York, Camebridge University Press, 2005.
[65] Lopez-Ibor JJ, Christodoulou G, Maj M, Satorius N, Okasha A: Disasters and mental health. Chichester England, John Wiley, 2005.
[66] Wessely S: Victimhood and resilience. N Eng J Med 2005; 353: 548-550.
[67] Wessely S: Don't panic! Short and long term psychological reactions to the new terrorism: the role of information and the authorities. Journal of Mental Health 2005; 14: 1-6.
[68] Shephard B: 'Pitiless Psychology': the role of prevention in British military psychiatry in the Second World War. Hist Psychiatry 1999; 10: 491-524.
[69] Shephard B: A war of nerves, soldiers and psychiatrists 1914-1994. London, Jonathan Cape, 2000.
[70] Stein DJ, Gureje O: Depression and anxiety in the developing world: is it time to medicalise the suffering? Lancet 2004; 364: 233-234.
[71] Finestone A: A doctor's dilemma: is a diagnosis disabling or enabling? Arch Intern Med 1997; 157: 491-492.
[72] Huibers MJH, Wessely S: The act of diagnosis: pros and cons of labeling chronic fatgue syndrome. Psychol Med 2006; 36: 895-900.

PART III: WAR AND CHILDREN

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 11

BIO-BEHAVIORAL CONSEQUENCES OF TRAUMATIC STRESS IN CHILDHOOD AND ADOLESCENCE: THE EFFECTS OF WAR ON CHILDREN'S MENTAL HEALTH, GROWTH AND DEVELOPMENT

Panagiota Pervanidou, Gerasimos Kolaitis and George P. Chrousos
First Department of Pediatrics and Department of Child Psychiatry
Athens University Medical School, Athens, Greece;
Aghia Sophia Children's Hospital, Athens, Greece

ABSTRACT

There is growing evidence of a profound impact of all types of trauma on children's mental health, growth and development. At times of crisis, children represent one of the most vulnerable groups, while the effects of stress during critical periods of brain development and physical growth may be irreversible. Natural disasters and man-made catastrophes, such as war, are major causes of emotional and behavioral manifestations and disorders in childhood. Pediatric posttraumatic stress disorder (PTSD) represents a common trauma-related disorder. Chronic dysregulation of the two main axes of the stress system, the Hypothalamic-Pituitary-Adrenal (HPA) Axis, and the Arousal/autonomic (sympathetic) nervous systems are frequently found in individuals with PTSD. Chronically disturbed secretion of stress hormones may be damaging the developing organism in many ways.

1. INTRODUCTION

The exposure of large population groups to traumatic life events may lead to development of a variety of neuropsychiatric manifestations in a significant proportion of the population, even subjects not having preexisting mental health problems. The nature, severity, timing and duration of the trauma, as well as the biological vulnerability of the individual, may influence differentially the type and prevalence of resultant mental disorders. Indeed, a

variety of mass traumatic life events, such as earthquakes or wars, have been associated with a spectrum of different mental disorders (1). Childhood and adolescence are critical periods for the development of emotional and behavioral problems and the effects of traumatic experiences in these vulnerable periods of life may alter the activity of stress system. Posttraumatic Stress Disorder (PTSD) is the most common trauma-related disorder, but one should also consider a variety of other conditions in addition to PTSD, such as acute stress disorder (ASD), generalized anxiety, depression, substance abuse, and conversion reactions that can develop alone or co-morbidly with PTSD (2,3).

2. PTSD AND CO-MORBIDITIES

PTSD describes a syndrome of distress that develops after exposure to events or circumstances that involved actual death or injury or a threat to the physical integrity of the individual or others and that evoked intense fear, helplessness, or horror. PTSD emerged as a clinical diagnosis in 1980 and it is classified as an anxiety disorder, based on the (DSM-IV). Symptoms include: 1) Re-experience of the initial trauma via intrusive memories and/or dreams about the event, feeling as if the trauma was continuing to occur, and intense distress on exposure to cues that recall the event. In young children, repetitive play or trauma specific re-enactment may occur, in which themes or aspects of the trauma are expressed. 2) Avoidance of stimuli associated with the trauma and numbing of overall responsiveness. 3) Symptoms of excessive arousal, including insomnia, angry outbursts, hyper-vigilance, an exaggerated startle response, and difficulty concentrating. PTSD lasts at longer than four weeks, as opposed to Acute Stress Disorder that begins within one month of the event and lasts from two days to four weeks (4).

Developing humans are more vulnerable to trauma than adults. Children and adolescents are about one-and-a-half times more likely to be diagnosed with PTSD when traumatized than adult trauma victims (5,6). In community samples of adolescents, a life- time prevalence of 5-10% was reported, while below age 10, PTSD prevalence has not been adequately registered. Traumatic events or severe stressors have been recognized most to often affect children in cases of natural disasters, war, sexual or physical abuse and accidents (5,6). Evidence from the 1999 earthquakes in Greece revealed a 78% of PTSD symptoms in children and parents 6 months after the event (7), while “everyday” stressors, such as Motor Vehicle Accidents, also caused PTSD in 30% of children 1 month after the event (8).

PTSD is often co-morbid with other clinical conditions, such as major depressive disorder (MDD) and generalized anxiety disorder (GAD) (3), as well as a number of psychopathological manifestations, such as somatic complains, depressive symptoms or symptoms of dissociation (9). Depression seems to be the most common co-morbid diagnosis of PTSD, reported in around one-third of the PTSD population in one study of adolescents, while GAD was prevalent in 27%. Overlap of all three diagnoses may occur in as many as 14% of the patients (3).

Terr differentiated single from repeated traumas and suggested that greater dissociation was related to repeated trauma (10). Children exposed to chronic and repeated stressors, such as family physical or sexual abuse, neglect, war or harassment may develop personality changes, suicidal behaviors, depression and other psychiatric disorders, including

posttraumatic stress disorder. Estimates of high rates of PTSD are more frequently reported in children following natural or man-made disasters, such as earthquakes, motor vehicle and other kind of accidents, as well as witnessing violence.

Children may differ from adults in their psychologic and physiologic responses to severe stressors and the possible influences of stress on developmental processes should be addressed specifically at different age groups. Few studies show that PTSD may manifest differently, depending on the developmental stage of the child.

Infants and pre-school children are not able to describe their internal status or express responses to the environment, thus clinical assessment is based on behaviors observed. Infants or toddlers may become very aggressive or distressed at reminders of the trauma. Posttraumatic play repeatedly mimicking the trauma is frequent in young children. They may also exhibit nightmares and significant sleep disruption.

School age children often respond to trauma with behavioral reactions -aggression, withdrawal or avoidance and antisocial behavior- at home and at school-. Regression to earlier developmental stages is not rare in this age group. A significant number of preschool and school age children are reported by their parents or teachers as being involved in repetitive play or drawings involving themes related to the trauma.

Adolescents can better express their internal state and describe symptoms. They are often focused on the social stigma of trauma, particularly sexual trauma (11).

3. BIOLOGICAL STRESS SYSTEMS AND THE DEVELOPING ORGANISM

Physiology and Pathophysiology of the Stress System

While concepts of stress adaptation have been developed in adults, the same principles also generally apply to children and adolescents. The two main axes of the stress system involved in the adaptive response to stressors are the hypothalamic-pituitary-adrenal (HPA) axis and the *locus caeruleus*/norepinephrine-sympathetic nervous system (LC/NE-SNS). Normally, activation of the stress system leads to behavioral and physical adaptive changes that improve an organism's ability to survive. Excessive and prolonged activation of the stress system, however, might lead to long-term psychopathology and physical health complications. Increased and prolonged production of Corticotropin-releasing Hormone (CRH), cortisol and the catecholamines could explain many of the psychiatric, circulatory, metabolic and immune manifestations of such syndromes. However, repeated or chronic stress might also result in hypo-activation of the HPA axis, likely reflecting a compensatory physiologic adaptation (12).

Dysregulation of the stress response, leading to hyperarousal and chronic activation of the HPA axis and the Arousal/sympathetic nervous systems, is typically described in major depression. Indeed, hypersecretion of CRH and cortisol have been shown in melancholic depression, while a spectrum of other conditions may be associated with increased and prolonged activation of the HPA axis. Hypoactivation of the stress system, on the other hand, with chronically reduced secretion of CRH also resulting in pathologic manifestations, characterizes other pathologic states, such as the chronic fatigue and fibromyalgia syndromes (12, 13). The direction of HPA axis responses under chronic stress may depend on the genetic

background, previous exposures to stress, the nature of the stressor, as well as its chronicity, severity and predictability. Age and developmental stage are critical variables in determining not only the clinical manifestations of chronic stress-related syndromes, but also of the biological patterns of disease (12, 13).

Biology of PTSD

The HPA axis and the LC/NE-SNS are involved in the pathophysiology of PTSD (14). Neuroendocrine studies in adults with PTSD have demonstrated altered HPA axis activity, as evidenced by elevated basal cerebrospinal fluid (CSF) CRH concentrations (15) and, seemingly, contradictory results from peripheral measurements (16) showing low 24h excretion of urinary free cortisol in the majority of studies (15-18), low or normal plasma cortisol levels (14, 19), or even high cortisol levels (20,21). The direction of HPA axis activity, as evidenced by peripheral cortisol measures, may depend on the age, gender, type and chronicity of stressor, co-morbid depression or other psychopathology, and time since the traumatic experience. On the other hand, biomarkers of Arousal/sympathetic nervous system activity are more consistent, showing in the majority of studies increased catecholamine secretion in PTSD patients compared to control subjects (22, 23).

Endocrine systems, which are crucial for growth and puberty, including the gonadal, growth hormone and thyroid axes, are influenced by the activity of the HPA axis. Chronic changes of these systems as a result of increased HPA axis activity could have irreversible effects on growth and development during critical periods of life (24). In addition, childhood trauma may alter CNS development: early severe stress results in elevated levels of CNS CRH and glucocorticoids, affecting specific, vulnerable brain areas, such as the prefrontal cortex, the amygdala and the hippocampus (25). Studies in children post trauma have shown increased Arousal/SNS activity, as in adults, however, cortisol levels have been reported high, normal or low (26-29).

A recent study from our group (8) investigated the natural history of pediatric PTSD after motor vehicle accidents: initially elevated evening cortisol concentrations and a disturbed circadian rhythm on admission and at the end of the first month post trauma, normalized in PTSD subjects at month 6, while initial plasma noradrenaline elevations became greater, revealing a divergent longitudinal interaction between the HPA axis and the Arousal/sympathetic nervous system. This could be the result of lifting of a cortisol-mediated noradrenergic system restraint. Clinical symptoms observed in PTSD patients may, thus, also be attributed to cortisol dysregulation that fails to restrain the catecholaminergic response of the loc*us caeruleus* and the noradrenergic brainstem centers of the sympathetic nervous system, leading to PTSD development and maintenance over time (30).

Recent research has also focused on proinflammatory cytokines, such as interleukin (IL)-6**,** as indicators of an inflammatory response to physical and emotional stress and disruption of the HPA axis (31). Immune system functioning has been investigated in adults with PTSD and the majority of studies have reported increased levels of circulating or CSF pro-inflammatory cytokines (32-35). We have shown that elevated IL-6 concentrations are predictive of later PTSD development in children and adolescents after motor-vehicle accidents (36).

Transgenerational Effects of Trauma, Parental PTSD and Fetal Programming of the HPA Axis and Genetic Vulnerability to PTSD

Parental PTSD is a significant risk factor for pediatric PTSD, as evidenced by a greater prevalence of PTSD -despite no direct trauma exposure- in adult offspring of Holocaust survivors with PTSD (37). The extent to which any risk factor for PTSD is associated with parental exposure, including prenatal factors, is unknown. Transgenerational effects of trauma have been often attributed to nongenetic postnatal influences, such as traumatization of the offspring by the parents's nonverbal communication of their trauma to the child or other consequences of parental stress-induced emotional/behavioral disorders leading to poor parenting. Other hypothesized mechanisms may be related to early social regulation (38), underlying genetic susceptibility or *in utero* glucocorticoid-mediated programming (39). Indeed, in mothers exposed to the 11th of September attacks during pregnancy, maternal PTSD symptoms were related to awakening and bedtime salivary cortisol levels in their babies; lower cortisol values were noted in infants of PTSD mothers than mothers exposed to the event but not having developed PTSD (40).

Lifetime prevalence of exposure to traumatic events is between 40% and 90% in the general population, however, the overall lifetime prevalence of PTSD is estimated at 7-12% (41, 42). PTSD is a complex and multifactorial disorder and, as most other mental disorders, polygenic. Candidate genes associated with basic clinical traits, such as biochemical, endocrine, neuroanatomical, cognitive and psychiatric features, include the serotonin (5-HTT), and dopamine (DAT) transporters, the glucocorticoid receptor (GR), the GABA (A) receptor, apo-lipoprotein E (APOE), brain-derived neurotrophic factor (BDNF) and neuropeptide Y (NPY) (43). Data on genetic PTSD vulnerability are still scarce and some positive findings are difficult to interpret due to the small numbers of subjects studied.

4. A FOCUS ON THE EFFECTS OF WAR

Evidence from the recent Balkan wars shows that this unfortunate human condition left psychologic consequences in the developing population, increasing the prevalence of psychologic disorders by approximately 15% compared to the pre-war circumstances (44). PTSD is the most common war-related psychiatric disorder, occurring among combat veterans and other people exposed to war stress (45). Eighty percent of the victims of war are children and women and the psychologic impact of war on them has been studied first in World War II and more recently in Israel, Lebanon and Kuwait (46,47). Not only the direct effects of war, but also the loss of family members, deprivation of basic needs, food, water and shelter, have adverse impact on children. Parental PTSD, especially when chronic and persistent, is a strong risk factor for PTSD development in children. Consequently, PTSD vulnerability, development and chronicity in children, through transgenerational effects of war-trauma is an area of active and promising investigation (48).

War related stress

Although the majority of published articles on war-related trauma involves adults, a few significant contributions have been made by pediatric clinical researchers: during the Second World War, Bodman (49) described a sample of school aged kids who developed emotional problems, such as nightmares, fears related to war, increased reactivity on exposure to war-related stimuli, avoidance and aggressive reactions, after they were exposed to repeated air raids. In the same period, Mercer (50) described trauma-related recollections and nightmares of French children exposed to war. They also noted attention deficits and academic difficulties among these children. Following the Second World War, in 1949, Carey-Trefzer (51) found that 18% of children exposed to various forms of war-related stress exhibited difficulties caused or worsened by war stress. These symptoms included nightmares, phobias, irritability, attention deficits, memory impairment, sleep disturbances and avoidance behaviors.

In the ensuing years, several studies confirmed war –related stress reactions in Israeli adolescents who experienced the Israeli-Jordanian frontier in 1978 (52), as well as the course of self-reported anxiety in adolescents before and after the 1982 Israeli incursion into Lebanon (53,54). The above mentioned studies, describing general war-related psychopathology in children and adolescents, although involved different ethnic groups, stressors, measures and data collection procedures, reported that the majority of children and adolescents exposed to war-related stressors, did not develop long-term emotional impairments. In a more recent study in Kosovo (55), three major groups of stressors were identified as having an impact on children's health and well-being: first, lack of cultural and social security resources at home and the community, second, poor physical and mental health conditions and, third, school-related stressors.

War and PTSD

After PTSD emerged as a clinical diagnosis in younger age groups, several studies reported high rates of war-related PTSD development in the youth: a study in Lebanese children revealed a current prevalence of 32.5% of PTSD development among children affected by war. In a related study by Saigh (56,57), high rates of PTSD were reported in children exposed to extreme forms of stress through direct exposure (e.g. being shot), observation (e.g. witnessing the execution of a parent or sibling), information transmission (e.g. learning about the traumatic experiences of a parent or sibling) or combination of these stressors (58).

Another research group (59) described psychiatric morbidity in a sample of Cambodian adolescents who immigrated to the USA after experiencing violent conditions in their home country. These subjects, between the ages of 8 and 12, had experienced "catastrophic trauma caused by separation, personal injuries, and the witnessing of many deaths and executions". Two-and-a-half years after immigration to the USA, 50% of these individuals met criteria for PTSD diagnosis. Another 3 years later, 30 % of these young adults presented with PTSD.

Evidence from the Gulf War, also focused on child and adolescent PTSD: Nader et al. (60) reported that 70% of the individuals examined had PTSD, while Weisenberg et al., (61)

reported that 25.6% of Israeli children, in grades 5 through 10, presented with PTSD 3 weeks after the war. These individuals remained with their families in hermetically sealed rooms, wearing gas masks during Iraqi attacks. More recently, in the 1992-1995 Bosnia and Herzegovina war, when the entire social system was destroyed, many children were left without family and a social support system. In a study performed in 2002 (62), 186 school-aged children were assessed for PTSD and depression. PTSD was present in 51% of the children, with the highest prevalence among children in the SOS Villages. PTSD prevalence was higher among children having lost one parent but living with the surviving one than children living in the orphanage or children living with both parents. Depression was diagnosed in 22.6 % of the children, but no statistical difference was found among the three groups. PTSD, depression and suicidal thoughts were highly interrelated in this sample. Parental influences seemed to be very important as children having lost one parent had higher frequencies of PTSD and depression, while the loss of both parents was associated with a high prevalence of PTSD but not depression. In Sri Lanka, war and family violence were studied (63): 30% of the schoolchildren had PTSD and 19.5% had Major Depression. A dose-effect relation between exposure to stressful experiences and PTSD was noted in the children examined.

Despite methodological differences in assessing childhood PTSD, it is clear that a great percentage, but not the entire population, develops PTSD after exposure to major trauma. It should be noted that females have higher PTSD rates than males and that the prevalence of the disorder decreases over time. Because of the lack of developmentally appropriate tools in preschoolers, the prevalence of PTSD and other trauma-related psychopathology at this age group has not been fully assessed. Co-morbidity represents an other important area of interest, for clinicians and researchers: PTSD, depression and suicidal thoughts are highly co-morbid in adult studies. However, few studies have investigated this parameter in childhood.

War-related stress affects all family members: parental psychopathology or war-related psychological disturbances is a variable that highly impacts pediatric psychopathology. Higher rates of depression and PTSD are noted in children living in vulnerable families, whose members continue the mourning process, and the surviving parent or other family members are suffering, than children living in a more stable –even without parents- environment. The surviving parent and other family members can also have PTSD and depression and may be unable to create a safe and protective environment for their child's development. Parental psychopathology, *per se*, is a well established risk factor for childhood psychopathology and other difficulties. In a study conducted in the Gaza Strip, both children and parents reported a high number of experienced traumatic events and high rates of PTSD and anxiety, indicating that symptoms and emotional responses are interrelated, and also that interventions should focus on families (64).

Positive parent-child interactions play an important protective role that favors resilience in children (65). Severe loss and the absence of care in children may be as predictive of psychological distress as exposure to severe external trauma (66).

Lastly, a group at high risk for mental health disorders and, consequently, in need of special interventions, are the child soldiers. A recent study examined former soldiers in Nepal, of a mean age of 15.75 years at the time of the study: 55% presented with PTSD, 53% with depression, 6% with anxiety and 62% with functional impairment (67).

Traumatic Experiences and Suicide in Adolescents

Suicides in adolescents are less frequent than in older age groups, however, taking into account all causes of death in adolescence, suicides are ranked among the two or three leading causes of death for those 15 to 25 years old. Furthermore, a series of suicide attempts is frequently leading to a successful suicide, thus previous suicidal behavior that may start in adolescence represents a powerful predictor for future suicide (68). In his book "Adolescent Suicide", Jacobs (69) was among the first to recognize the role of life events in adolescent suicidal attempts. The effect of life events in the development of suicidal thoughts and attempts may be cumulative: in a study of Mexico City adolescents, prevalence of suicidality was high among adolescents with traumatic experiences, ranging from 43% among those with a history of sexual abuse to a 25% among those that purposefully injured, tortured or killed someone. Number of events was associated with increased suicidality, such as those reporting three or more events were 13.7 times more likely to attempt a suicide than those with none (70).

Although war and suicide in children and adolescents has not been directly investigated, a few studies report suicidal thoughts in children post war. However, the experience of multiple and continuous war-related traumatic stressors, as described above, may play an important role in initiating the cascade of depressive and suicidal thoughts leading to an effective attempt.

5. POTENTIAL IMPLICATIONS FOR GROWTH AND DEVELOPMENT

Interactions between genetic background, biological stress systems and a unique psychosocial environment influence the developing organism. Childhood and adolescence are periods of great plasticity for the stress system and its actions. Excessive activation of the stress system during these periods may have irreversible effects on brain development, endocrine systems and behavior.

In contrast to the adult brain, where trauma may result in some sensitization of mature structures, there is evidence that alterations of biological stress systems in traumatized children with developing brains may have significant permanent effects (71). Studies in animals suggest that elevated levels of catecholamines and cortisol may lead to alterations in brain development, through mechanisms of accelerated loss of neurons (72,73), delays in myelination (74), or abnormalities in developmentally appropriate pruning (75). Elevated levels of glucocorticoids during traumatic stress may result in frontal lobe deficiencies, amygdala hyperfunctioning and hippocampal damage and consequent learning and concentration difficulties (72). Smaller hippocampal volumes and functional deficits in memory were found in adults with PTSD secondary to childhood abuse (76) and women survivors of childhood sexual abuse with and without PTSD (77).

Furthermore, chronically elevated cortisol levels may inhibit growth hormone or sex steroid secretion and cause accumulation of fat in visceral adipose tissues, as well as metabolic alterations (24,78-80). Increased cortisol secretion or chronic administration of pharmacologic doses of glucocorticoids have been associated with depression and parameters on the full Metabolic Syndrome, including visceral obesity, hypertension, insulin resistance,

carbohydrate intolerance and/or diabetes mellitus type 2, dyslipidemia, dyscoagulation and osteoporosis (11) (Figure 1).

A recent study in adults, who survived the siege of Leningrad in 1941-1944 when they were children, adolescents or young adults, revealed that women who were 6-8 years old and men who were 9-15 years old at the peak of starvation had higher systolic blood pressure than unexposed individuals. Furthermore, higher mortality from ischemic heart and cerebrovascular disease was noted in women and men exposed at age 6-8 and 9-15 respectively, showing that the experience of severe stress in childhood may have long-term consequences in survivors (82).

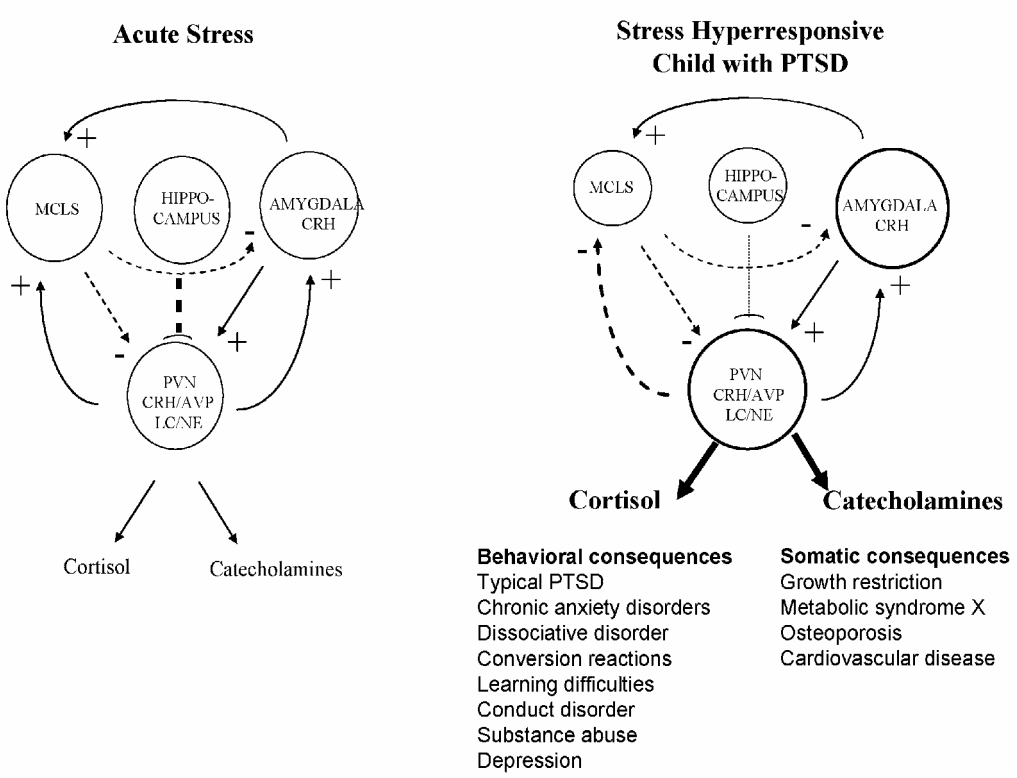

Figure 1. The model of the hyperresponsive stress system in the stress hyperreactivity syndrome has pathophysiologic similarities with the pediatric type of PTSD. MCLS, Mesocorticolimbic (Reward) system; PVN CRH/AVP, Paraventricular nucleus CRH and Arginine-Vasopressin; LC/NE, Locus caeruleus (Arousal)/ Norepinephrine -Sympathetic Nervous system.Adapted from: Chrousos GP and Gold PW 1999: "The inhibited child syndrome". Thoughts on its Potential Pathogenesis and Sequelae. In: Extreme Fear, Shyness and Social Phobia: Origins, Biological Mechanisms and Clinical Outcomes, (eds.) L. A. Schmidt, J. Schulkin, Oxford Univ. Press, New York p. 193-200

The hormonal mediators of the stress response are essential for adaptation and maintenance of homeostasis, but acting over long time periods may exact a cost for the organism (allostatic load) producing damaging effects (83). In mood and anxiety disorders, substance abuse, and PTSD, the term allostatic load represents all the biological and psychological disturbances that damage health and curtail the life expectancy of an individual (11,83).

6. CONCLUSION

Adverse experiences in early childhood represent a major risk factor for both mental and physical morbidity and mortality in later life. In critical periods of life, trauma-related alterations in the biological stress systems and vulnerability of certain brain and other body regions to stress mediators may result in cognitive-behavioral deficits and psychopathology, as well as visceral fat accumulation and metabolic syndrome manifestations. Posttraumatic stress disorder could be regarded as an anxiety or mood disorder, or a chronic stress syndrome with metabolic consequences and at the same time as an externally induced developmental disorder. Low magnitude, time-limited and predictable stressful experiences in childhood may represent a common feature of early life, most frequently leading to positive adaptations rather than psychopathology. In this view, proper adaptation after trauma can be considered as a positive factor for proper growth and psychological development.

REFERENCES

[1] Murthy RS: Psychiatry. Mass violence and mental health -- Recent epidemiological findings. *Int Rev Psychiatry.* 2007 Jun;19(3):183-192

[2] Yule W: Posttraumatic stress disorder in the general population and in children. *J Clin Psychiatry.* 2001;62 Suppl 17:23-8

[3] Kar N, Bastia BK: Post-traumatic stress disorder, depression and generalised anxiety disorder in adolescents after a natural disaster: a study of comorbidity. *Clin Pract Epidemol Ment Health.* 2006 Jul 262:17

[4] American Psychiatric Association 1994 *Diagnostic and statistical manual of mental disorders-DSM-IV, 4TH ed.* Washington DC: American Psychiatric Press

[5] Yule W: Posttraumatic stress disorder in the general population and in children. *J Clin Psychiatry.* 2001;62 Suppl 17:23-28

[6] Yule W: Post-traumatic stress disorder. *Arch Dis Child*. 1999 Feb;80(2):107-109

[7] Kolaitis G, Kotsopoulos J, Tsiantis J, Haritaki S, Rigizou F, Zacharaki L, Riga E, Augoustatou A, Bimbou A, Kanari N, Liakopoulou M, Katerelos P: Posttraumatic stress reactions among children following the Athens earthquake of September 1999. *Eur Child Adolesc Psychiatry.* 2003 Dec;12(6):273-80

[8] Pervanidou P, Kolaitis G, Charitaki S, Lazaropoulou Ch, Hindmarsh P, Bakoula Ch, Papassotiriou I, Tsiantis J, Ghrousos GP: The natural history of neuroendocrine changes in pediatric posttraumatic stress disorder after motor vehicle accidents: progressive divergence of noradrenaline and cortisol concentrations over time. **Biol Psychiatry.** 2007 Nov 15;62(10):1095-1102

[9] Ruchkin V, Schwab-Stone M, Jones S, Cicchetti DV, Koposov R, Vermeiren R: Is posttraumatic stress in youth a culture-bound phenomenon? A comparison of symptom trends in selected U.S. and Russian communities. *Am J Psychiatry.* 2005 Mar;162(3):538-44

[10] Terr LC: Childhood Traumas-an outline and overview. *American Journal of Psychiatry,* 1991; 27:96-104

[11] Pervanidou P, Chrousos GP: Post-traumatic Stress Disorder in Children and Adolescents: From Sigmund Freud's "Trauma" to Psychopathology and the (Dys) metabolic Syndrome. *Horm Metab Res*. 2007 Jun;39(6):413-9

[12] Chrousos GP, Gold PW: The Concepts of Stress and Stress System Disorders. *JAMA* 1992; 267:1244-1252

[13] Charmandari E, Tsigos C, Chrousos G: Endocrinology of the Stress Response. *Ann Rev Physiol* 2005; 67: 259-84.

[14] Yehuda R, Giller EL, Southwick SM, Lowy MT, Mason JW: Hypothalamic-pituitary-adrenal dysfunction in posttraumatic stress disorder. *Biol Psychiatry* 1991; 30(10):1031-48

[15] Baker DG, West SA, Nicholson WE, Ekhator NN, Kasckow JW, Hill KK, Bruce AB, Orth DN, Geracioti TD Jr: Serial CSF corticotropin-releasing hormone levels and adrenocortical activity in combat veterans with posttraumatic stress disorder. Am J Psychiatry 1999; 156(4):585-8. Erratum in: *Am J Psychiatry* 1999 Jun;156(6):986

[16] Yehuda R: Biology of posttraumatic stress disorder. *J Clin Psychiatry* 2001;62 Suppl 17:41-6

[17] Pitman R and Orr S: Twenty –four urinary cortisol and catecholamine excretion in combat–related posttraumatic stress disorder. *Biol Psychiatry* 1990; 27:245-247 15.

[18] Yehuda R, Kahana B, Binder-Brynes K, Southwick SM, Mason JW, Giller EL: Low urinary cortisol excretion in Holocaust survivors with posttraumatic stress disorder *Am. Journal of Psychiatry* 1995;152:982-986.

[19] Boscarino JA: Posttraumatic stress disorder, exposure to combat, and lower plasma cortisol among Vietnam veterans-findings and clinical implications. *J Consult Clin Psychol* 1996; 64 :191-201

[20] Lemieux AM and Coe CL: Abuse related posttraumatic stress disorder: evidence for chronic neuroendocrine activation in women. *Psychosom. Med*. 1995;. 57, 105-115.

[21] Maes M, Lin A, Bonaccorso S, van Hunsel F, Van Gastel A, Delmeire L, Biondi M, Bosmans E, Kenis G, Scharpe S: Increased 24-hour urinary cortisol excretion in patients with post-traumatic stress disorder and patients with major depression, but not in patients with fibromyalgia. *Acta Psychiatr. Scand.* 1998; .98(4), 328-335.

[22] Yehuda R, Southwick S, Giller EL, Ma X, Mason JW: Urinary catecholamine excretion and severity of PTSD symptoms in Vietnam combat veterans. *J Nerv Ment Dis*. May 1992 ; 180(5):321-5

[23] Southwick SM, Paige S, Morgan CA 3rd, Bremner JD, Krystal JH, Charney DS: Neurotransmitter alterations in PTSD: catecholamines and serotonin. *Semin Clin Neuropsychiatry* 1999; 4(4):242-8

[24] Charmandari E, Tsigos C and Chrousos G: Endocrinology of the Stress Response. Annu.Rev.Physiol 2005; 67:259-84

[25] Teicher MH, Andersen SL, Polcari A, Anderson CM, Navalta CP Developmental neurobiology of childhood stress and trauma. *Psychiatr Clin North Am*., 2002 June;25(2):397-426

[26] De Bellis MD, Chrousos GP, Dorn LD, Burke, L., Heimers, K., Kling, M.A., Trickett, P.K., Putnam F.W: Hypothalamic-pituitary-adrenal axis dysregulation in sexually abused girls. *Journal of Clinical Endocrinology and Metabolism* 1994; 78:249-255

[27] De Bellis MD, Thomas LA: Biological findings of posttraumatic stress disorder and child maltreatment. *Curr Psychiatry Rep* 2003: 5(2):108-17

[28] Goenjian AK, Yehuda R, Pynoos RS, Steinberg AM, Tashjian M, Yang RK, Najarian LM, Fairbanks LA: Basal cortisol, dexamethasone suppression of cortisol, and MHPG in adolescents after the 1988 earthquake in Armenia. *Am J Psychiatry* 1996;153(7):929-34

[29] 29. Ciccheti D, Rogosch FA: Diverse patterns of neuroendocrine activity in maltreated children. Dev Psychopathol., Summer 2001;13(3): 677-93

[30] 30. Pervanidou P: Biology of posttraumatic stress disorder in childhood and adolescence *J.* Neuroendocrinol. 2008 May;20(5):632-638

[31] Chrousos G.P: The hypothalamic-pituitary-adrenal axis and immune-mediated inflammation. *N. Engl. J. Med*. 1995; 332(20), 1351-1362

[32] Rohleder N, Joksimovic L., Wolf JM, Kirschbaum C: Hypocortisolism and increased glucocorticoid sensitivity of pro-Inflammatory cytokine production in Bosnian war refugees with posttraumatic stress disorder *Biol Psychiatry* 2004; 55(7), 745-751.

[33] Sutherland AG, Alexander DA, Hutchison JD: Disturbance of pro-inflammatory cytokines in post-traumatic psychopathology. *Cytokine* 2003; 24, 219-225

[34] von Kanel R, Hepp U, Kraemer B, Traber R, Keel M, Mica L, Schnyder U: Evidence for low-grade systemic proinflammatory activity in patients with posttraumatic stress disorder. *J. Psychiatr. Res*. 2007.41(9), 744-752

[35] Baker DG, Ekhator N N, Kasckow JW, Hill KK, Zoumakis E, Dashevsky BA, Chrousos GP, Geracioti TD Jr: Plasma and cerebrospinal fluid interleukin-6 concentrations in posttraumatic stress disorder. *Neuroimmunomodulation* 2001;9(4), 209-217

[36] Pervanidou P, Kolaitis G, Charitaki S, Margeli A, Ferentinos S, Bakoula C, Lazaropoulou C, Papassotiriou I, Tsiantis J, Chrousos GP. Elevated morning serum interleukin (IL)-6 or evening salivary cortisol concentrations predict posttraumatic stress disorder in children and adolescents six months after a motor vehicle accident. *Psychoneuroendocrinology*. 2007 Sep-Nov;32(8-10):991-999

[37] Yehuda R, Halligan SL, Bierer LM: Cortisol levels in adult offspring of Holocaust survivors: relation to PTSD symptom severity in the parent and child. *Psychoneuroendocrinology*. 2002; 27(1-2):171-80

[38] Gunnar MR, Donzella B: Social regulation of the cortisol levels in early human development. *Psychoneuroendocrinology*. 2002;27(1-2):199-220.

[39] Seckl JR, Meaney MJ: *Glucocorticoid "programming" and PTSD risk*. Ann N Y Acad Sci. 2006;1071:351-78.

[40] Yehuda R, Engel SM, Brand SR, Seckl J, Marcus SM, Berkowitz GS:Transgenerational effects of posttraumatic stress disorder in babies of mothers exposed to the World Trade Center attacks during pregnancy.*J. Clin. Endocrinol. Metab*. 2005 ;90(7):4115-8.

[41] Kessler RC, Sonnega A, Bromet E, Hughes M, Nelson CB: Posttraumatic stress disorder in the National Comorbidity Survey. *Arch Gen Psychiatry* 1995; 52(12):1048-1060.

[42] Breslau N: The epidemiology of posttraumatic stress disorder: what is the extent of the problem? *J Clin Psychiatry*. 2001;62 Suppl 17:16-22.

[43] Broekman FFP. Olff M, Boer F: The genetic background of PTSD. *Neuroscience and Behavioral Reviews*. 2007.31:348-362

[44] Danes V, Horvat V: Psychological consequences of war stress in the developing population in Bosnia and Herzegovina. *Psychiatr Danub*. 2005;17(3-4):225-229

[45] Lee I: Second international conference on wartime medical services. *Med War* 1991; 7:120–128

[46] Jensen PS, Shaw J: Children as victims of war: current knowledge and future research needs. *J Am Acad Child Adolesc Psychiatry* 1993; 32:697–708

[47] Chimienti G, Nasr JA, Khalifeh I: Children's reaction to war-related stress. *Soc Psychol Psychiatr Epidemiol* 1989; 24:282–287

[48] Saigh PA, Fairbank JA, Yasik AE: War-Related Posttraumatic Stress Disorder among Children and Adolescents , in Children of Trauma: *Stressful life events and their effects on children and adolescents.* Edited by Miller TW. International Universities Press Inc, 1998, pp119-140

[49] Bodman F: War conditions and the Mental Health of the child. *Brit. Med J* 1941; 11:486-488

[50] Mercer MH and Despert JM, Psychological effects of the war on French children . *Psychosom. Med* 1942; 5: 266-272

[51] Carey-Tafez, CJ: The results of a clinical study of war-damaged children who attended a child guidance clinic. *J. Ment. Sci.*, 1949, 95:535-559

[52] Kristal L: Bruxism: an anxiety response to environmental stress. *In: Stress and Anxiety,* Vol , e.d. CD Spielberger & IG Sarason. New York: Wiley, 1978, pp 45-58

[53] Saigh PA: Adolescent anxiety following varying degrees of war stress in Lebanon. *J Clin Child Psychology* 1985a;14:210-215

[54] Saigh PA: An experimental analysis of delayed postraumatic stress among adolescents. *J Gen Psychol*, 1985b; 146:125-131

[55] Barath A: Children's Well-being after the War in Kosovo: Survey in 2000. *Croatian Medical Journal* 2002; 43(2): 199-208

[56] Saigh PA: The development and validation of the Children's Posttraumatic Stress Disorder Inventory. Internat. *J.Spec. Edu* 1989a;4:75-84

[57] Saigh PA: The validity of the DSP-III posttraumatic stress disorder classification as applied to children. *J Abnorm Psychology* 1989b; 98:189-192

[58] Saigh PA: On the development of posttraumatic stress disorder pursuant to different modes of traumatization. *Behav. Res & Ther* 1991; 29:213-216

[59] Kinzie JD, Sack WH, Angeli RH, Clarke G and Ben R, A three year follow-up of Cambodian young people traumatized as children. *J. Amer. Acad. Child & Adol Psychiatry* 1989; 28:501-504

[60] 60. Nader K, Pynoos R, Fairbanks L, Frederick C, Al- Ajeel M, & Al-Asfour A A preliminary study of PTSD and grief among the children of Kuwait following the Gulf crisis. *Brit. J.Clin. Psychol* 1993; 32:407-416

[61] Weisenberg M, Schwarzwald J, Waysman M, Solomon Z, & Klingman A: Coping of school-age children in the sealed room during Scud missile bombardment and postwar stress reactions. *J. Consult. & Clin. Psychol* 1993; 61: 462-467

[62] Hasanovic M, Sinanovic O, Selimbasic Z, Pajevic I.,Avdibegovic E: Psychological Disturbances of Wae-traumatized Children from different foster and family settings in Bosnia and Herzegovina *Croat Med J*. 2006; 47:85-94

[63] Catani C, Jacob N, Schauer E, Kohila M, Neuner F: Family violence, war and natural disasters: a study of the effect of extreme stress on children's mental health in Sri Lanka *BMC Psychiatry* 2008 May 2; 8:33

[64] Thabet AA, Tawahina A, Sarraj El, Vostanis P: Exposure to war trauma and PTSD among parents and children in the Gaza Strip *Eur Child Adolesc Psychiatry* 2008;17(4):191-199

[65] Gribble, PA, Cowen EL., Wyman PA., Work WC., Wannon M., Raoof A.: Parent and child views of parent-child relationship qualities and resilient outcomes among urban children/ *J Child Psychol Psychiatry* 1993; 34:507-519

[66] Cournos: The trauma of profound childhood loss: a personal and professional perspective. *Psychiatr Q* 2002; 73:145-56

[67] Kohrt BA, Jordans MJ, Tol WA, Speckman RA, Maharjan SM, Worthman CM and Comroe IH: Comparison of mental health between former child soldiers and children never conscripted by armed groups in Nepal *JAMA* 2008 Aug 13;300(6):691-702

[68] Van Egmond M and Diekstra RFW: The predictability of suicidal behaviour: The results of a meta-analysis of published suicides. *In Suicide Prevention: the role of Attitude and Imitation*, ed. RFW Diekstra, RA Maris, S Platt, A. Schmidke, &G. Sonneck. Leiden, Netherlands:Brill 1989.

[69] Jacobs J.:1971,*Adolescent Suicide. New York* :Wiley-Interscience

[70] Borges G., Benjet C., Medina-Mora ME., Orozco R., Molnar BE., Nock MK *J: Child Psychol Psychiatry* 2008 Jun; 49(6):654-666.

[71] DeBellis MD, Keshavan MS, Clark DB, Casey BJ, Giedd JN, Boring AM, Frustaci K and Ryan ND: Developmental Traumatology Part II: *Brain Development* 1999; 45:1271-1284

[72] Edwards E, Harkins K, Wright G, Menn F: Effects of bilateral adrenalectomy on the induction of learned helplessness. *Behav Neuropsychopharmacol* 1990; 3:109 –114.

[73] Sapolsky RM, Uno H, Rebert CS, Finch CE: Hippocampal damage associated with prolonged glucocorticoid exposure in primates. *J Neurosci* 1990; 10:2897–2902.

[74] Dunlop SA, Archer MA, Quinlivan JA, Beazley LD, Newnham JP: Repeated prenatal corticosteroids delay myelination in the ovine central nervous system. *J Maternal-Fetal Med* 1997; 6:309 –313

[75] Lauder JM : Neurotransmitters as morphogens. *Prog Brain Res*1988; 73:365–388.

[76] Bremner JD, Scott TM, Delaney RC, et al: Deficits in short-term memory in post-traumatic stress disorder. *Am J Psychiatry* 1993; 150:1015–1019.

[77] Stein MB, Koverola C, Hanna C, Torchia MG, McClarty B: Hippocampal volume in women victimized by childhood sexual abuse. *Psychol Med 1997;* 27:1–9.

[78] Chrousos GP and Gold PW 1999: *The inhibited child "syndrome"*. Thoughts on its Potential Pathogenesis and Sequelae. In: Extreme Fear, Shyness and Social Phobia: Origins, Biological Mechanisms and Clinical Outcomes, (eds.) L. A. Schmidt, J. Schulkin, Oxford Univ. Press, New York p. 193-200

[79] Bjorntorp P. Do stress reactions cause abdominal obesity and comorbidities? The international association of the study of Obesity. *Obesity reviews* 2001;2: 73-86

[80] Rosmond R. Role of stress in the pathogenesis of the metabolic syndrome. *Psychoneuroendocrinology* 2005; 30(1):1-10.

[81] Koupil I., Shestov DB., Sparen P., Plavinskaja S., Parfenova N., Vagero D: Blood pressure, hypertension, and mortality from circulatory disease in men and women who survived the siege of Leningrad 2007; *Eur J Epidemiol* 22(4):223-234

[82] McEwen, B.S., 2004: Protection and damage from acute and chronic stress: allostasis and allostatic overload and relevance to the pathophysiology of psychiatric disorders. *Ann. N. Y. Acad. Sci.* 1032,1-7.

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 12

TRAUMA AND POSTTRAUMATIC STRESS IN CHILD SOLDIERS OF WORLD WAR II

Philipp Kuwert and Harald J. Freyberger
Ernst-Moritz-Arndt University of Greifswald, Greifswald, Germany

ABSTRACT

Background: The aim of the study was to determine the amount of trauma impact and significant posttraumatic stress symptoms indicating a possible Posttraumatic Stress Disorder (PTSD) in a sample of former German child soldiers of World War II. *Methods:* 103 participants were recruited by the press, then administered a modified Posttraumatic Diagnostic Scale (PDS). *Results:* Subjects reported a high degree of trauma exposure. 4.9 % reported significant posttraumatic stress symptoms indicating a possible PTSD after WW II, 1.9 % until present. *Conclusion:* In line with other studies on child soldiers in actual conflict settings, our data document a high degree of trauma exposure during war. Surprisingly, the prevalence of significant posttraumatic stress symptoms indicating a possible PTSD was low, also compared to other groups of ageing longterm survivors of war trauma. Despite some limitations our data highlight the need for further studies to identify resilience and coping factors in traumatised child soldiers.

INTRODUCTION

The exploitation of children as soldiers is one of the most inhuman characteristics in actual conflict settings. Worldwide, approximately 300 000 children are currently abused as soldiers [1]. They experience severe traumatic events like threat to their life, injuries, detention, torture, death of others and indirect stressors such as displacement or lack of food (Somasundaram, 2002). The few studies on child soldiers of current conflicts document an extremely high amount of trauma exposure and posttraumatic stress symptoms. Almost all the children experienced several traumatic events and prevalence estimates of posttraumatic stress disorder (PTSD) range from 31 % to 97 % [2, 3]. *The Lancet* underlined the terrible indictment of 21st century priorities to neglect the exploitation of child soldiers in armed

conflicts [4]. However, the abuse of child soldiers is not only a feature of current conflict settings.

One of the less known historical facts of World War II is the recruitment of approximately 200 000 German children as soldiers by the Nazi government [5]. The complex challenges associated with retirement and old age topics see many former child soldiers confronting the issues of their deployment in World War II. Not only the short-term mental health impact of being a child soldier has been studied sparse so far, but also very little is known about its long-term consequences. In fact, the sequelae of trauma have been so extensively unrecognized in the geriatric, trauma and lay communities that some speak of it as "hidden variable" in the lives of elderly people [6]. So far, there has been no study on late life effects of exposure as a child soldier worldwide and on this particular group of longtime survivors in Germany. The *WWII Anti-Aircraft Auxiliaries Project* is the first study worldwide to investigate the late-life effects of such a deployment. Concludingly, the aim of this project was to determine the amount of trauma and posttraumatic stress symptoms in former German child soldiers of World War II.

METHODS

Participants were recruited by an article in the press, publishing our search for former child soldiers of World War II.

The *Posttraumatic Diagnostic Scale* (PDS) represents a 49-item self-report instrument for the assessment of PTSD [7]. The items correspond to the criteria A to F of the DSM-IV [8], and a diagnosis is very likely if all six criteria are met. Criterion A1 is covered by a checklist of 12 traumatic events. In case of more than one trauma, individuals are asked to refer to the most distressing event when completing the subsequent sections including criterion A2, B (*intrusions*: 5 re-experiencing symptoms), C (7 avoidance symptoms) and D (5 arousal symptoms). The frequency of each of the 17 symptoms in the past month is rated on a 4-point scale (0 = *not at all or only one time*; 3 = *five or more times a week/ almost always*). The duration of the PTSD and the subsequent impairment in different life areas are finally assessed. Additionally, the scale allows quantifying the symptom severity by summing the individual's responses corresponding to the PTSD symptom clusters of *intrusions*, *avoidance* and *arousal*. For the purpose of our study the PDS was modified as followed: Subjects were asked to name the four worst experiences of their exposure as child soldiers during World War II, then referring to the most distressing event when completing the questionnaire as described above.

RESULTS

103 former child soldiers completed the questionnaires. Their mean age was 78.8 years (SD = 1.3). 102 men and one woman participated at the study. 79.6 % were married, 18.4 % widowed, 1 % divorced and 1 % single. All participants were retired. 61.3 % had a university degree, 28.1 % had been employed as qualified workers, 10.6 % as unqualified workers. Their mean age at onset of combat was 15.6 years (SD = 1.2), range: 9 - 17 years. Their mean

length of deployment in World War II was 11.8 months (SD = 10.3). As reason for the end of deployment, 50.5 % named war captivity, 11.7 % injury, 21.4 % end of war and 16.5 % other reasons. The mean duration of captivity was 20.6 months (SD = 21.5). Table 1 presents a detailed description of the reported traumatic events. The child soldiers reported an average of 2.7 traumatic events during deployment. As can be seen, 90.3 % of the participants named direct combat exposure (29.1 % of the former child soldiers named more than one particular event, e.g. air raids and tank attacks), 42.7 % described traumatic events due to captivity, 37.9 % reported witnessing death of a fellow soldier, 17.5 % own injury and 11.7 % witnessed Nazi war crimes as executions of prisoners of concentration camps.

Table 1. Traumatic events of former child soldiers as assessed by the modified PDS

	All traumatic events		Worst traumatic event	
	N	%*	N	%
- combat exposure	93	90.3**	42	40.8
- witnessing death of a mate	39	37.9	19	18.4
- trauma during captivity	44	42.7	16	15.5
- trauma during withdrawal	18	6.5	4	3.9
- own injury	16	17.5	7	6.8
- Separation from family	7	6.8	2	1.9
- witnessing war crimes	12	11.7	6	5.8
- Other war-related trauma	25	24.3	3	2.9

* "4 worst experiences in WW II", percentages refer to the total number of participants (N = 103)
** 30 participants (29.1 %) reported more than one traumatic experience during combat exposure

According to the PDS 5 participants (4.9 %) met the DSM-IV criteria for a possible PTSD at some time after World War II and 2 participants (1.9 %) were still suffering from significant posttraumatic stress symptoms indicating a possible PTSD at the time of the present study. The mean value of subscale B (*intrusions*) was 0.71 (SD 1.28), of subscale C (*avoidance*) was 0.73 (SD 1.27) and of subscale D (*arousal*) was 0.45 (SD 0.95).

CONCLUSION

The aim of our study was to assess the amount and type of trauma and posttraumatic stress symptoms in a sample of former German child soldiers of World War II. In line with previous studies on child soldiers in actual conflict settings [2, 3], we found an extremely high degree of traumatic impact: Combat exposure, traumatic events during withdrawal and captivity, witnessing death of fellow mates, own injury and witnessing war crimes were remembered frequently.

Astonishingly, only 1.9 % of the former child soldiers suffered under significant posttraumatic stress symptoms indicating a possible PTSD. In contrast to this result, a previous study on elderly German people who have been warchildren – not soldiers - in World War II documented a prevalence of 10.8 % of significant posttraumatic stress symptoms indicating a possible PTSD with the same instrument [9]. This difference is in need of explanation. Information about posttraumatic stress symptoms regarding prevalence, phenomenology and risk factors in older adults remains limited. Some elderly people –

particulary men and former soldiers – may underreport psychological symptoms perceiving them as weakness [6]. The former child soldiers themselves named some possible reasons which helped them coping with the deployment: Most frequently they described a good social support to their fellow soldiers and the officers. Some also labelled the possibility to defend themselves with weapons as protective, compared to the "powerless" situation of civil child victims. The relatively high current social and economical status of the participants might have had contributed to their resilience, as most of them are married and have an University degree. Another reason for the comparatively low prevalence of current posttraumatic symptoms among the former child soldiers could be the age of the participants: The mean age was almost 79 years, compared to 67 years in the study on the former warchildren. In PTSD research there is a growing evidence that posttraumatic stress symptoms are associated with a higher mortality [10]. Concludingly, the older participants are most probably a relatively resilient group of longtime survivors. It would be important to analyze possible factors, which could have contributed to the resilence in longtime survivors of war trauma. Protective factors which have been recently discussed in war trauma research are posttraumatic growth [11] and the sense of coherence [12]. To optimize our knowledge on the complex interactions between stress and coping mediators after war trauma it would be necessary to design longitudinal prospective studies, which is often a hazardous challenge due to the circumstances in (post-) conflict-settings.

However, several methodological limitations have to be considered: Participants were found by the press, which raises the question of participation bias: On one side, people could have been interested in participating due to the awareness of their personal grief; on the other hand, there is evidence that highly traumatized subjects have difficulties in participating at research, which could possibly undermine their defenses [13]. Due to the decades between trauma and assessment recall bias could be another important limitation. PTSD-measures were based on a self-report screening instrument (PDS) and were not validated by a structured interview. Although the scale showed good agreement (82%) with the PTSD module of the SCID [7], PTSD diagnoses based on the PDS must be considered presumptive.

Despite these limitations, the present study highlights again the extreme amount of traumatic exposure in child soldiers. It is an ethical and political task to tackle this specific exploitation of children and adolescents worldwide.

REFERENCES

[1] Unicef: *www.unicef.org*. 2009
[2] Somasundaram D: Child soldiers: understanding the context. *BMJ* 2002; 324(7348): 1268-1271.
[3] Derluyn I, Brokaert E, Schuyten G, de Temmermann E: Post-traumatic stress in former Ugandan child soldiers. *Lancet* 2004; 363(9412): 861-863.
[4] Lancet: The hidden health trauma of child soldiers. *Lancet* 2004; 363(9412): 831.
[5] Nicolaisen H: Die Flakhelfer. *Luftwaffenhelfer und Marinehelfer im II*. Weltkrieg. 1981; Berlin: Ullstein.
[6] Cook JM, O'Donnell C: Assessment and psychological treatment of posttraumatic stress disorder in older adults. *J Geriatr Psychiatry Neurol* 2005; 18(2): 61-71.

[7] Foa EB, Cashman L, Jaycox L, Perry K: The validation of a self-report measure of posttraumatic stress disorder: The Posttraumatic Diagnostic Scale. *Psychological Assessment* 1997; 9(4): 445-451.

[8] *American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th edition ed.* 1994, Washington, DC: American Psychiatric Press.

[9] Kuwert P, Spitzer C, Traeder A, Freyberger HJ, Ermann M: Sixty years later: post-traumatic stress symptoms and current psychopathology in former German children of World War II. *Int Psychogeriatr* 2006; 19: 955-961.

[10] Schnurr PP, Green BL: Understanding relationships among trauma, post-tramatic stress disorder, and health outcomes. *Adv Mind Body Med* 2004; 20(1): p. 18-29.

[11] Solomon Z, Dekel R: Posttraumatic stress disorder and posttraumatic growth among Israeli ex-pows. *J Trauma Stress* 2007; 20(3): 303-312.

[12] Kuwert P, Spitzer C, Dudeck M, Vogel M, Freyberger HJ, Ermann M: Psychological complaints, interpersonal problems, quality of life and sense of coherence in former German warchildren. *Psychother Psychosom Med Psychol* 2007; 58: 257-263.

[13] Newman E, Kaloupek DG: The risks and benefits of participating in trauma-focused research studies. *J Trauma Stress* 2004; 17(5): 383-394.

PART IV: PHYSICAL INJURY AND SUICIDE

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 13

COMBAT RELATED PHYSICAL INJURY AND SUICIDAL BEHAVIOR

Abel Koshy
West London Mental Health NHS Trust, London, United Kingdom

ABSTRACT

The psychiatric problems of combat returnees are a topical and important issue given the ongoing conflicts in Iraq and Afghanistan. There is increasing global recognition both within the military and society in general of combat related psychological dysfunction, including (but not limited to) post-traumatic stress disorder, in veterans, particularly in recent years.

Whilst recent years have witnessed increasing interest and focused research into various aspects of combat related psychiatric and psychological morbidity both amongst service personnel and the civilian population, data on the specific correlates of suicidal behavior amongst servicemen who have survived major physical trauma (distinct from traumatic brain injury, which is covered in chapter 11) with resulting disability and/or disfigurement is limited.

Changing conditions in the nature and characteristics of warfare and the increasing potency and destructive capabilities of both conventional and newer military hardware have raised the proportion of some types of wounds, and increased the incidence of multiple injuries. Improved methods of evacuation and advances in medical science have resulted in the survival of many service personnel who previously would have succumbed to their injuries. (1)

This chapter would endeavor to outline some key issues pertinent to this area, with the hope that further interest and impetus for more specific research into this relatively under researched aspect of combat related morbidity would be generated.

INTRODUCTION

Survivors of traumatic physical injuries share a number of problems. Along with their physical limitations, they experience altered body image, lowered self-esteem, and changes in

their personal relationships.(1) Some bear the social stigma associated with crippling and deformity.(1) It is only since World War II that these features have been recognized and specialized programs set up for amputees, paraplegics, and the burned and the blind. (1)

An exhaustive consideration of the full range of battlefield injuries is obviously beyond the scope of this discussion, and what follows is essentially a synopsis of the broad issues around combat related physical injury, psychiatric morbidity, and suicidal behavior.

For the purposes of this narrative, suicidal behavior would be taken to include the following entities:

- Completed suicide: An intentional act of self-harm that results in death.
- Attempted suicide: An act of self-harm that is intended to result in death but does not. Frequently, suicide attempts involve at least some ambivalence about wishing to die and may be a cry for help.
- Suicide gesture: An act of self-harm that is unlikely to result in death. For example, people may scratch their wrists only superficially or take an overdose of vitamins
- Suicidal ideation (though strictly speaking not a "behavior", it is included in this discussion given its immediate relevance to the topic in question).

COMBAT RELATED PHYSICAL INJURY

Polytrauma is a medical term describing the condition of a person who has been subjected to multiple traumatic injuries, such as a serious head injury and a serious burn.

The term has become common among US military doctors in describing the seriously injured soldiers returning from Operation Iraqi Freedom (Iraq) and Operation Enduring Freedom (Afghanistan). The term however is generic, and has been in use for a long time for any case involving multiple traumata.

Polytrauma often results from blast injuries sustained by improvised explosive devices, or by a hit with a rocket-propelled grenade. Improvised explosive devices, blasts, landmines, and fragments account for about 65 percent of combat injuries.(2) The combination of high-pressure waves, explosive fragments, and falling debris may produce multiple injuries including brain injury, loss of limbs, burns, fractures, blindness and hearing loss, (3) with 60 percent of those injured in this way having some degree of traumatic brain injury. (2)

In a sense, the high incidence of polytrauma is in fact a sign of medical advancement, for in previous wars, soldiers with such multiple damage types simply did not survive in most cases, even if quickly transferred into hospital care. The downside is however that many of the victims, though surviving, will never fully regain their premorbid physical or mental form.

More traditional combat related injuries of potential psychological significance can follow major amputations, spinal cord injury with paralysis, facial disfigurement from missile wounds and burns, blindness, and mutilating wounds of the external male genitalia, and are briefly considered at the end of the chapter.

PSYCHIATRIC MORBIDITY AND COMBAT RELATED PHYSICAL INJURY

It has been found that over 90% of those killing themselves by suicide may be judged to have some form of psychiatric illness. (4) It would therefore only seem logical to first address aspects of psychiatric morbidity in general among the war injured in order to better understand the association of war injury with suicidal behavior.

Recent decades have witnessed growing attention to the associations between physical and psychological injuries, that is, to the psychological consequences of physical injury caused by a traumatic event.(5) Traditional views, particularly psychoanalytically informed ones, tended to regard bodily injury as a protective factor against the development of posttraumatic stress disorder (PTSD) . (6) For example, Merbaum and Hefez found that wounded soldiers (representing the full range of injury severity) showed minimal psychological disturbances. (7)

On the other hand, numerous studies of injured trauma survivors have challenged these traditional understandings of the relationship between PTSD and physical injury. Studies in wounded Vietnam veterans have found two- to threefold higher rates of PTSD among this population than among those who returned unharmed. (8, 9) Also, while a few studies have shown that risk for PTSD is associated with severity of injury (10), other studies have failed to replicate these results. (9, 11)

Koren et al suggest that despite the marked variability in the reported rates of PTSD among injured populations, traumatic injury not only does not reduce the risk for PTSD, as believed by traditional psychoanalytic views, but may even increase it. (12)

In their study Koren and colleagues aimed to study the unique contribution of physical injury, over and above that of the trauma itself, to the subsequent development of PTSD. (12) More specifically, their goals were to 1) replicate previous findings regarding higher than average rates of PTSD in injured survivors of combative actions and 2) evaluate the relationship of PTSD symptoms with both the nature and severity aspects of the injury. (12)

The findings indicated the odds of developing PTSD following traumatic injury are approximately eight times higher than following injury-free trauma. (12) In fact, they suggest that even this rather high figure might be an underestimate. This is so because about 35% of the originally approached injured soldiers, but none of the noninjured comparison subjects, refused participation. From the explanations that these nonparticipants gave for their refusal, they felt it was quite obvious that many of them did so for reasons that could be understood as avoidance behavior. (12)

Interesting findings from the study highlight the unique interplay between combat related physical trauma, PTSD and other co morbid psychiatric conditions. For example, the study found that while associated with higher levels of anxiety and depressive symptoms, bodily injury in its own right was not related to increased prevalence of co morbid psychiatric diagnoses. Indeed it was demonstrated rather, that psychiatric comorbidity was significantly related to presence or absence of PTSD. (12) The researchers discovered that this was consistent with previous studies, suggesting a strong association between PTSD and psychiatric comorbidity among injured trauma survivors. Taken together, they conclude that PTSD has a moderating influence on general psychiatric comorbidity following traumatic injury. (12)

Though not directly examined, this landmark study also raised interesting hypotheses about the possible role of independent biological mechanisms that may mediate between injury and PTSD. (12) The proposed mechanisms relate to the complex interactions between the immune and stress-regulating systems, in particular the interaction between the hypothalamic-pituitary-adrenal (HPA) axis and proinflammatory mediators such as cytokines. (13) In addition to its key role in the regulation of the stress response, the HPA axis is also involved in modulation of the immune response to inflammation and injury through proinflammatory mediators such as cytokines (14). Since alterations in the HPA axis have been suggested as a vulnerability factor for PTSD (15), situations that involve both emotional and injury-related stress may create an extra burden on an already compromised HPA axis. While this hypothesis has yet to be explored, numerous preclinical studies found that cytokines have adverse effects on memory, sleep, and mood, and sickness behavior (15). Another study (16) found elevated CSF concentrations of interleukin-6 in patients with PTSD versus normal comparison subjects.

SUICIDAL BEHAVIOR AND COMBAT RELATED PHYSICAL INJURY

General physical and medical morbidity is a well recognized and studied risk factor for suicidal behavior. Additionally a number of studies have specifically examined the association between acute medical conditions and suicidal ideation among patients.

A study by Kishi and colleagues explores the prevalence and patterns of suicidal ideation among in patients admitted with acute life-threatening physical illnesses such as Stroke, Traumatic Brain Injury, Myocardial Infarction, and Spinal Cord Injury, though not necessarily as a consequence of battlefield injury. (17)

This study found that 36 (7.3%) patients with acute medical illness had clinically significant suicidal ideation. The suicidal ideation occurred mostly among patients with major depression and sometimes in those with minor depression. About 25% of patients with major depression and acute physical illnesses were found to have developed suicidal ideation. After the improvement of depressive disorders, suicidal ideations were ameliorated. (17)The authors suggest that the detection and treatment of depressive disorders is the most important factor in preventing suicide among this patient population. (17)

Data and evidence looking more specifically at combat related physical injury and suicidal behavior is limited. A study of a cohort of Vietnam veterans with posttraumatic stress disorder reported an almost sevenfold statistically significant risk of suicide when comparisons were based on the US population and a fourfold increased risk when comparisons involved Vietnam veterans with no diagnosis. (18)

Bullman and Kang suggest an increased risk of accidental poisoning (as a result of taking prescription painkillers or psychotropics) among veterans who experience pain or depression as a result of their wounds. The immediate access to powerful painkillers and other potentially lethal drugs might also be associated with an increased risk for suicide. They also talk about literature relating to underreporting of suicides. (19) Some of these accidental poisonings and even some of the accidental drowning and motor vehicle accidents may have been suicides that were either intentionally or unintentionally misclassified. (20)

Bullman and Kang's investigation provided a unique opportunity to examine the effect of combat trauma, as measured by receiving a combat wound or wounds in Vietnam, on the risk of post service suicide. (19) The largest statistically significant increased risk for suicide was observed for those veterans hospitalized for a wound and wounded two or more times. The risks of overall causes of death and deaths due to circulatory diseases were not similarly affected by level of trauma. The two surrogate markers of combat trauma used in the study were the number of times wounded and the severity of trauma. They conclude that number of times wounded (frequency) appears to be a more important risk factor for suicide than receiving a wound requiring hospitalization (severity). (19)

Although the study lacked data on the psychological and behavioral characteristics that may potentially predispose individuals to injury and suicide, the researchers conclude that a history of having been wounded in the Vietnam conflict was a risk factor for post service suicide, and additionally demonstrating the differential risks by severity of wound and number of times wounded. (19)

SOME SPECIFIC INJURIES

Classic textbooks of military medicine have dealt with the issues of psychiatric and psychological morbidity associated with the more traditional battlefield injuries. Weinstein discusses specific injuries and associated medical conditions such as amputation, phantom limb, disfigurement, blindness, spinal cord injury, castration, and genital mutilation. (1)

AMPUTATION

Amputation of a limb as a result of an injury in combat has been described as capable of having profound and unique behavioral consequences. There are the emotional reactions to the initial trauma, the problems of coping with the motor disability, the alterations of body image caused by the loss of a previously healthy arm or leg, and the neurophysiological and psychological aspects of phantom limb phenomena. (1)

The phantom limb, the experience of sensation in the severed extremity, is virtually universal amongst amputees, with a range of subjective experience from being so mild that the amputee is aware of it only when his attention is directed toward it to more vivid experience. (1) There has been an apparent decline in the incidence of severe and enduring phantom pain since World War II. Prior literature and reports of observations early in the war described suffering so intense as to lead to serious depression, morphine addiction, and suicide. (1)

Previous studies of veterans have examined the risk of suicide associated with other types of trauma. One such study examined a group of war amputees whose suicide rate was 37% higher than that of the general population. (21)

SPINAL CORD INJURIES

Suicidal ideation is very common in the first days after injury but it rarely materializes.(22) Suicide, however, may be a problem later on and Hohmann warns that it is a great mistake to assume that because a patient is disabled his incapacity will physically preclude his trying to kill himself. (23) A 20-year follow-up of veterans of World War II with traumatic myelopathies revealed suicide to be the third most common cause of death, ranking behind only renal failure and secondary amyloidosis. (24)

DISFIGUREMENT

Major disfigurement, involving the face and hands, occurs mainly as the result of burns, and of blast and missile wounds. Serious depression is manifested in feelings of hopelessness and thoughts of suicide, insomnia, lethargy, and poor cooperation as in refusal to eat. Suicidal ideation and gestures are rare during initial hospitalization, but they may occur following discharge. (1)

BLINDNESS

Loss of vision is a particularly catastrophic event that can profoundly alter a soldier's perception of reality, robs him of his mobility, and ends a way of life. (1) Changing conditions of warfare have markedly increased the incidence of eye injuries. Soldiers who have been blinded in combat are not usually unconscious unless they have sustained a brain injury but, as in paraplegia, they may not be immediately aware of their visual loss. (1) When they find they cannot see they react in various ways. In some cases, they go into in a state of emotional and cognitive withdrawal. They may believe that the visual loss is only temporary and that they will see when the swelling subsides or the bandages are removed. Some are in a state of despair, talk of suicide, and express regret that they were not killed outright. Others are relieved and thankful that they were not injured more seriously. (1)

CASTRATION AND GENITAL MUTILATION

Weinstein discusses the paucity of statistical data in this area, and hence the uncertainty about whether the association of genital wounds with amputations, spinal cord injuries, and blindness or facial disfigurement or both adds to the suicide rate or increases the incidence of behavioral disturbances. (1) Phantoms of the genitals may occur but have not been reported in the literature of recent wars. (1)

CONCLUSION

The studies and literature reviewed here point to convincing evidence of the strong associations not only between combat related physical injury and psychiatric morbidity, but additionally with suicidal behavior in particular. These relationships are by new means straightforward, but rather a representation of the complex and dynamic interplay between multiple biological, psychological, and environmental variables at various levels. Given the statistical rarity and inherent methodological difficulties of working with suicide and suicidal behavior as an outcome measure (more so in the combat arena), as opposed to standard measures of psychological and psychiatric morbidity, the relative paucity of scientific literature specifically examining its links with combat related physical morbidity is not surprising.

However, the literature and evidence quoted in here should hopefully demonstrate the importance of further focused enquiry into this area, further examining the correlates of such behavior amongst the war injured. For instance, an analysis of the baseline premorbid psychological and behavioral profiles of this cohort may reward us with useful insights into the nature of these associations, and could have potential implications from the point of view of suicide prevention and proactive risk management.

At a biological level, a potential area of research could be that of studying into the biochemical and endocrinological mechanisms underlying the association between combat injury and suicidal behavior, as demonstrated by Koren et al's study. (12) Although this looked at PTSD in particular, this would be relevant with respect to studying suicidal behavior as well, possibly demonstrating the role of biological mechanisms acting independently, but nevertheless synergistic with psychological processes.

REFERENCES

[1] Weinstein WE: *Disabling and disfiguring injuries: War Psychiatry:* Textbook of Military Medicine, Office of the Surgeon General USA, Borden Institute, 1995, pp 353-381.

[2] Department of Veterans Affairs, *VHA HANDBOOK* 1172.1 , Veterans Health Administration, Washington, DC 20420, 2005

[3] *Presidents Project: Support for VAMC Polytrauma Centers* (from the American Legion Auxiliary website)

[4] Barraclough BM: A hundred cases of suicide: clinical aspects. *British Journal of Psychiatry;* 125: 355-373

[5] O'Donnell ML, Creamer M, Bryant RA, Schnyder U, Shalev A: Posttraumatic disorders following injury: an empirical and methodological review. *Clin Psychol Rev* 2003; 23:587–603

[6] Ulman RB, Brothers D: A self-psychological reevaluation of posttraumatic stress disorder (PTSD) and its treatment: shattered fantasies. *J Am Acad Psychoanal* 1987; 15:175–203

[7] Merbaum M, Hefez A: Some personality characteristics of soldiers exposed to extreme war stress. *J Consult Clin Psychol* 1976; 44:1–6

[8] Kulka RA, Schlenger WE, Fairbank JA, Hough RL, Jordan BK, Marmar CR, Weiss DS: *Trauma and the Vietnam War Generation*: Report of Findings From the National Vietnam Veterans Readjustment Study. New York, Brunner/Mazel, 1990

[9] Pitman RK, Altman B, Macklin ML: Prevalence of posttraumatic stress disorder in wounded Vietnam veterans. *Am J Psychiatry*1989; 146:667–669

[10] Michaels AJ, Michaels CE, Moon CH, Smith JS, Zimmerman MA,Taheri PA, Peterson C: Posttraumatic stress disorder after injury: impact on general health outcome and early risk assessment. *J Trauma* 1999; 47:460–467

[11] Mellman TA, David D, Bustamante V, Fins AI, Esposito K: Predictors of post-traumatic stress disorder following severe injury *Depress Anxiety* 2001; 14:226–231

[12] Koren D, Arnon I, Klein E: Acute stress response and posttraumatic stress disorder in traffic accident victims: a one-year prospective, follow-up study. *Am J Psychiatry* 1999; 156:367–373

[13] Schobitz B, Reul JM, Holsboer F: The role of the hypothalamic pituitary-adrenocortical system during inflammatory conditions. *Crit Rev Neurobiol* 1994; 8:263–291

[14] Yehuda R: Biology of posttraumatic stress disorder. *J Clin Psychiatry* 2001; 62(suppl 17):41–46

[15] Larson SJ, Dunn AJ: Behavioral effects of cytokines. *Brain Behav Immun* 2001; 15:371–387

[16] Baker DG, Ekhator NN, Kasckow JW, Hill KK, Zoumakis E, Dashevsky BA, Chrousos GP, Geracioti TD Jr: Plasma and cerebrospinal fluid interleukin-6 concentrations in posttraumatic stress disorder. *Neuroimmunomodulation* 2001; 9:209–217

[17] Kishi Y, Robinson RG, Kosier JT: Suicidal ideation among patients with acute life-threatening physical illness: patients with stroke, traumatic brain injury, myocardial infarction, and spinal cord injury. *Psychosomatics* 42:382-390, October 2001

[18] Bullman TA, Kang HK. Posttraumaticstress disorder and the risk of traumatic death.*JNerv MentDis.* 1994; 182:604-610.

[19] Bullman TA, Kang HK. The risk of suicide among wounded Vietnam veterans. *American Journal of Public Health* 86: 662-667

[20] Holding TA, Barraclough BM. Psychiatric morbidity in a sample of accidents. *Br JPsychiatry.* 1977; 130:244-252.

[21] Bakalim G. Causes of death in a series of 4,738 Finnish war amputees. *Atif Lirnbs.*Spring 1969:27-36.

[22] Guttmann L. *Spinal Cord Injuries*. Comprehensive Management and Research, 2nd Edition. Oxford, England:Blackwell Scientific Publications; 1976: 280, 506–511.

[23] Hohmann GW. Psychological aspects of treatment and rehabilitation of the spinal cord injured patient. *Clin Orthop*. 1975; 112:81–88.

[24] Nyquist RH, Borg E. Mortality and survival in traumatic myelopathy during nineteen years from 1946-1965. *Paraplegia*. 1967; 5:22-48.

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 14

DEPLOYMENT-ACQUIRED TBI AND SUICIDALITY: RISK AND ASSESSMENT

Lisa A. Brenner and Beeta Y. Homaifar
VA VISN 19 Mental Illness Research Education and Clinical Center, Denver, Colorado, USA; University of Colorado Denver, School of Medicine, Denver, Colorado, USA

ABSTRACT

Introduction: Existing literature suggests that those with deployment-acquired traumatic brain injury (TBI) may be at increased risk for future suicidal behavior. Pertinent background information and potential best practices for assessing the risk of intentional self-injury in those with deployment-related TBI will be discussed. *Conclusion:* With the aim of comprehensively assessing risk, clinicians are encouraged to increase understanding regarding possible contributing factors (e.g., pre-existing vulnerabilities, TBI sequelae) in the context of military experiences. Using the Interpersonal-Psychological Theory of Suicide Risk and The International Classification of Functioning as organizing frameworks in conjunction with literature regarding post-TBI functioning may facilitate this process.

INTRODUCTION

Recent work suggests that Veterans are at increased risk for suicide in comparison to the general population. [1] Moreover, the Army has released findings which indicate that suicide is on the rise among military personnel. [2] While it is likely that there are numerous contributing factors (e.g., multiple deployments, psychiatric distress), the notable rate of traumatic brain injury (TBI) among those serving may be of import. [3,4]

Although literature is emerging regarding civilian-acquired TBI and suicide, [5-7] research is limited regarding suicidal behaviors among those who sustain TBIs secondary to combat or deployment. In fact, works by Achte, Lonnqvist, and Hillbom [8] and Vauhkonen [9] are the only readily available published research regarding suicide and post-war-acquired TBI. In both cases, the conflict during which such injuries were sustained was World War II.

[8,9] Achte, Lonnqvist, and Hillbom [8] studied 6,498 Finnish Veterans with brain injuries. Eighty-five of the war Veterans with confirmed histories of TBI died by suicide. Some individuals did not engage in lethal suicidal behavior until long after the injury. Prior to death, 59% communicated a desire to die and 25% had a history of post-injury suicidal behavior. Of those who died by suicide, psychiatric disturbance appears to have been a risk factor, with 75% having signs of depression and 30% having severe depression. Sixteen (19%) of those who died by suicide were "most probably" in a psychotic state at the time of death. Achte and colleagues [8] indicated that a "considerable proportion" of those who died by suicide had a pre-injury history of psychiatric and psychosocial difficulties (e.g., came from "broken homes") and alcohol misuse. Although suicide was associated with increased injury severity, no distinct pattern of lesion location was identified.

At the Fourteenth Congress of Scandinavian Neurologists, Vauhkonen [9] reported that 37 (14%) of 3,700 veterans who had contracted brain injuries during the war died by suicide. Eight of these disabled Veterans were unable to either "acquit" themselves of their previous work or adjust to a new trade. He wrote, "such persons usually undergo a modification of character towards depression," (p 91). [9] Other potential contributing factors noted included "growing disability" with financial difficulties or familial distress, pre-traumatic vulnerabilities, or post-traumatic psychosis.

These early works support more recent research regarding suicidality in those with TBI, some of which will be discussed below. However, these limited data, in conjunction with the dearth of research regarding the potential impact of acquiring a TBI during deployment, do not sufficiently increase clinicians' understanding regarding how a military context may further impact injury-related symptoms, psychiatric and psychosocial outcomes, and suicidality. The impact of war on suicide will be highlighted in other sections of this book. Hence the primary focus of this chapter is increasing understanding regarding TBI (civilian and military), sequelae, and associated outcomes. As literature regarding war-sustained TBI is also limited, discussion of injuries incurred by military personnel serving in Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) will be a focus. Additionally, we will use existing models of functioning (The International Classification of Functioning [ICF]) [10] and suicide risk (The Interpersonal-Psychological Theory of Suicide Risk) [11] and existing literature regarding functioning post-TBI to suggest potential best practices for suicide risk assessment in those with deployment-related TBIs.

CIVILIAN-ACQUIRED TRAUMATIC BRAIN INJURY

In 2003 there were an estimated 1.5 million TBIs in the United States. [12] According to the Centers for Disease Control, a TBI is caused by a "blow or jolt to the head or a penetrating head injury that disrupts the normal functioning of the brain". [13] Civilian-acquired TBI is commonly associated with rapid acceleration/deceleration (e.g., motor vehicle accidents, falls). [14] The severity of injury can range from mild (e.g., a brief alteration in consciousness) to severe (e.g., a prolonged period of unconsciousness). Criteria based upon brain functioning post-TBI (e.g., length of loss of consciousness) and imaging results are often used to assess injury severity. As individuals who sustain more severe injuries generally seek medical attention and positive physiologic markers are frequently

present (e.g., imaging, prolonged loss of consciousness), assessment, diagnosis, and surveillance regarding moderate and severe TBI is often less complicated.

Persons who sustain mild injuries may not seek medical attention, [15,16] and existing comprehensive surveillance systems are not in place. [17] As such, mild TBI incidence estimates are often based on unreliable data. [17] Nevertheless, existing numbers suggest that the vast majority of injuries sustained are mild in nature. [17] As defined by the Mild Traumatic Brain Injury Committee of the Head Injury Interdisciplinary Special Interest Group of the American Congress of Rehabilitation [18] a mild TBI is "a traumatically induced physiological disruption of brain function, as manifested by *at least* one of the following: 1) any period of loss of consciousness; 2) any loss of memory for events immediately before or after the accident; 3) any alteration in mental state at the time of the accident (e.g., feeling dazed, disoriented, or confused); and 4) focal neurological deficit(s) that may or may not be transient; but where severity of the injury does not exceed the following: loss of consciousness of approximately 30 minutes or less; after 30 minutes, an initial Glasgow Coma Sale (GCS) of 13-15; and posttraumatic amnesia (PTA) not greater than 24 hours," (p 86).

Short-term symptoms of moderate to severe injury are often addressed in acute and/or rehabilitative medical settings. Long-term impairments associated with more severe injury can be wide-ranging. Frequently, cognitive (e.g., executive dysfunction) and behavioral (e.g., aggression) symptoms are noted. [19] For those with mild TBI symptoms (e.g., headaches, fatigue, poor memory and concentration, dizziness) recovery generally occurs at home, and individuals often return to baseline functioning within three months post-injury. [20]

Psychiatric symptoms are also common after injury, with depression being most frequently reported. [21-25] Rates of post-TBI depressive disorders within the literature range from 6%-77%. [25] Alderfer, Arciniegas, and Silver [26] suggest this variability reflects between-study differences in diagnostic criteria, populations sampled, and the use of incidence versus prevalence. A history of TBI (mild, moderate, and severe) has also been linked to an increased risk of psychosis. [27] The relationship between TBI and psychiatric conditions, including substance abuse, is further complicated by the fact that both psychiatric symptoms [28] and problematic alcohol and drug use are risk factors for sustaining a TBI. [29] In addition, risk factors associated with sustaining TBI are frequently discussed as being risk factors for suicidal behavior.

Although more severe TBI is often associated with poorer outcomes, [30-32] functioning can be impacted by non-injury related factors. [33] For example, McCarthy et al [33] measured the subjective psychosocial health of a population-based sample of adults with TBI and found inadequate or moderate social support and pre-injury substance abuse to be associated with poor psychosocial well-being. Moreover, in those with TBI, perceived changes in psychosocial functioning appears to influence emotional well-being. [34] At the same time, associations between early post-injury depression and poor psychosocial outcomes have been suggested [35, 36]

Suicidal behavior has been identified as a negative psychiatric outcome post-TBI. [5-7] Using medical admissions from a Danish hospital and national death registries, Teasdale and Engberg [6] found that individuals with a history of TBI were at increased risk for death by suicide when compared to members of the general population. Risk was associated with injury severity and remained constant over the fifteen years of records available for review. Whereas the Standardized Mortality Ratio (SMR) for those in the most severely injured group

was 4.1 as compared to the general population, the SMRs for the subjects in the concussion and fracture groups were 3.0 and 2.7, respectively. Teasdale and Engberg [6] discussed the possibility that suicide among those with more severe TBI is a direct cause of the injury itself. They also suggested that associations between milder injuries and suicide "must have arisen from concomitant and perhaps premorbid characteristics" such as substance misuse (p 439). Of note, substance misuse was associated with increased rates of suicide among all TBI severity levels.

Simpson and Tate [5] recently evaluated risk factors associated with suicide among those with TBI and noted the role of post-injury psychiatric and emotional distress; however, they cautioned against drawing conclusions regarding causality. As such, research in the area of civilian-acquired TBI and suicide seems to emphasize pre-existing vulnerabilities (e.g., substance abuse) and post-injury psychiatric distress. Findings also suggest the possibility that there are two distinct populations of individuals with TBI who are at increased risk for suicide: 1) those with milder injuries and pre-existing psychosocial and psychiatric vulnerabilities which potentially account for the increased risk post-injury; and 2) those with more severe injuries whose suicidality is more directly related to post-injury sequelae and functioning.

The ICF model developed by the World Health Organization (WHO) [10,37] is one means of understanding factors that can impact how people live with TBI, regardless of injury severity. This model suggests that it is necessary to consider individual functioning and disability post-TBI within the context of personal and environmental factors. The concept of disability refers to impairment in bodily function (e.g., cognitive dysfunction), activity limitation (e.g., not being able to drive), and/or participation restriction (e.g., not being able to work). ICF definitions of activity limitation and participation restriction are as follows: 1) "Activity limitations are difficulties an individual may have in executing" a task or action (p 14); [10] and 2) "Participation restrictions are problems an individual may experience in involvement in life situations," (p 14). [10] As we will demonstrate in the context of this chapter, impairments, activity limitations, and participation restrictions can potentially contribute to suicidality in those with TBI, and should be considered within the environment in which the TBI was sustained.

DEPLOYMENT-ACQUIRED TRAUMATIC BRAIN INJURY

Although national data on the characteristics of injured OEF/OIF Veterans are not yet readily available, [38] it is accepted that TBIs of all severity levels are being sustained by US military personnel. [4,39,40] Reasons for this include the widespread use of explosive weapons in Iraq [41] and the potential relationship between blasts from such explosives and TBI. [41-43] Work by Godunsky and Reiter [41] showed that explosive munitions accounted for 97% of all combat-related injuries. [41] Another contributing factor is the increased likelihood of survival after blast exposure, due in part to advances in body armor and helmets. It has also been suggested that greater attention to TBI screening among military personnel has improved awareness and identification of mild injuries. [4,44]

Explosive munitions generate an instantaneous rise in pressure over atmospheric pressure which creates a blast over-pressurization wave. [40, 45] An interaction between the over-

pressurization wave and the body is believed to be the cause of primary blast injury with differences occurring between organ systems. [45, 46] TBIs may also be sustained from projectiles and related structural collapse (secondary blast injury), and Soldier bodily displacement (tertiary blast injury). [40, 41, 46] Research suggests that acceleration/ deceleration and blast-related injuries can occur in conjunction. [47] However, understanding of the relative contribution of each mechanism when they co-occur is limited.

With regard to moderate and severe TBIs, individuals are receiving treatment within the Department of Defense (DoD) and Veterans Affairs (VA) Polytrauma systems of care. [39, 48] Although information regarding incidence and outcomes are not currently available, it is expected that the establishment of a "unified TBI database across representative VA and DoD healthcare service locations", as discussed by Lew and colleagues (p viii), [39] may facilitate increased access to such information. At the same time, little is also known about the incidence of mild TBI among military personnel serving in Iraq, including how many of those who have mild TBI experience injury-related problems after returning home. Estimates of service members with mild TBI range from 11% to 23%. [3,4,44,49,50] Work by Terrio et al [4] suggests that although 22.8% of individuals in one Brigade Combat Team returning from Iraq had a history of clinician-confirmed mild TBI, only 7.5% of Soldiers with such injuries reported three or more post-concussive (PC) symptoms (headache, dizziness, balance problems, irritability, and memory problems) post-deployment. Similarly, work by Schneiderman et al [50] suggested a relationship between mild TBI and PC symptoms. However, in this study a history of post-traumatic stress disorder (PTSD) was found to be the strongest predictor of PC symptoms. Hoge et al [49] also discussed the complicated relationship between mild TBI and PTSD and suggested that the former was significantly associated with the latter. More than 40% of Soldiers with TBI met criteria for PTSD. [49] Findings that identify common symptoms between mild TBI and PTSD highlight diagnostic and treatment-related challenges. King [51] suggests that if both PTSD and TBI are present they can be "mutually exacerbating." Factors associated with sustaining deployment-acquired mild TBIs may be different from than those frequently discussed in relationship to civilian-acquired TBIs (e.g., psychiatric and/or psychosocial vulnerabilities). At the same time, military personnel may possess same or different pre-existing vulnerabilities and/or co-occurring psychiatric symptoms (e.g., post-traumatic) which impact short- and long-term outcomes.

Post-TBI the physical condition often affects psychological factors and vice versa. This compounding risk [52] may in part be related to disadvantaged pre-existing or environmental factors which accumulate [53] and result in a cascade of physical and mental health-related problems. [54-56] Inherent in the presented discussion regarding civilian- and deployment-acquired TBI and suicide is the idea that individuals who sustain such injuries may have multiple risk factors for suicide related to pre-existing vulnerabilities, the injury itself, and/or post-injury functioning. The possibility also exists that the risk factors are interactional in nature. For members of the military who sustain TBIs while deployed, the potentially increased constellation of interacting risk factors occurs in the context of the military culture.

TRADITIONAL SUICIDE RISK ASSESSMENT

Suicide risk assessment has traditionally tried to capitalize on the extensive study of risk [57] and protective [58] factors in the general population. Maris, Berman, and Silverman [58] present 62 empirically-identified risk factors for suicide in addition to 17 protective factors. Although risk factors provide population-based information regarding potential sources of increased risk, they have limited utility in predicting individual behaviors because they do not elucidate which factors are most salient and for whom. While the ability to identify factors that make an individual more or less likely to engage in suicidal behavior has significant clinical utility, [59,60] such knowledge does not allow us to predict who will die by suicide or why individuals engage in such behaviors. Support for this is provided by a qualitative study of individuals who reported that risk factors commonly identified in the literature were either absent or irrelevant to their subjective experience of factors underlying their suicide attempts. [61] Therefore, an individual could possess risk factors related to pre-existing vulnerabilities (e.g., substance abuse), the TBI itself (e.g., executive dysfunction), post-injury functioning (e.g., job loss), and the combat-related environment (e.g., PTSD), but never engage in suicidal thoughts, communications, or behaviors. It is also important to note that risk and protective factors that are commonly considered static could also be dynamic. With regard to protective factors, a study of TBI survivors indicated that individuals' interpersonal relationships were not stable and did not possess fixed characteristics. [62] Therefore, for a TBI survivor with pre-existing vulnerabilities for suicidal behavior (e.g., substance abuse) and TBI-related cognitive impairment (e.g., disinhibition) relationships could be a risk factor at one time point and protective at another.

As demonstrated above, risk factors for suicide have largely been identified via atheoretical, empirical study of factors associated with suicidal behavior. [63] Consequently there is a dearth of literature that provides a conceptual framework with which to understand an individual's subjective experience of suicidality. Mental health professionals also may find it difficult to organize and incorporate client-specific risk factors into case conceptualizations of suicide risk, particularly if individuals present with mutually exacerbating risk factors. Perhaps a more useful approach entails the use of a dynamic conceptual model which serves to organize a clinician's thinking about suicide risk.

THEORY-BASED SUICIDE RISK ASSESSMENT INCORPORATING SUICIDE AND REHABILITATION LITERATURES

This section will focus on describing a dynamic conceptual model by Joiner [11] and research confirming the components of his theory. The ICF [10] will be integrated with Joiner's theory as a way to understand and evaluate suicide risk in those with deployment-acquired TBI. Examples of how existing TBI literature can be used to enrich the proposed suicide risk assessment strategy will also be offered.

Through years of theory-building, refinement, and empirical validation, recent work by Joiner [11] represents an attempt to create a model aimed at increasing understanding about how and why people become suicidal. The Interpersonal-Psychological Theory of Attempted and Completed Suicide posits that those at risk for suicide perceive themselves as an

unbearable burden on their family, friends, and/or society (burdensomeness); their efforts at establishing and maintaining social connections have been repeatedly thwarted (failed belongingness); and through multiple experiences during which they have habituated to pain they acquire the ability to engage in suicidal behavior (habituation to painful stimuli/acquired ability). [11] When all of these key elements are present and there is a desire for death, suicidal behavior with lethal intent is likely and imminent. [11] For a complete discussion of The Interpersonal-Psychological Theory of Attempted and Completed Suicide refer to *Why People Die by Suicide*. [11]

Components of the theory have been tested in adults, [64, 65] college students, and adolescents. [66] However, research has not explored the theory's relevance to an active duty military population and has only begun to investigate whether the theory applies to Veterans. [67-69] With regard to the latter, a qualitative study of OEF/OIF Veterans by Brenner et al [69] found that concepts regarding burdensomeness and failed belongingness were salient for these individuals. Participants also described combat as a context for exposure to both physical and emotional pain and reported increased pain tolerance secondary to deployment-related experiences. In discussing perceived burdensomeness, Veterans in the Brenner et al [69] study reported seeing themselves as a burden to family and friends, particularly due to their inability to provide financial support. They also noted a lack of connection to non-military individuals (failed belongingness). [69] The components of burdensomeness and failed belongingness were often inextricably intertwined, a point highlighted by Joiner. [11]

If an individual has a TBI and related disabilities, such as cognitive/physical dysfunction (impairment), or inability to drive (activity limitation), or work (participation restriction), how might this impact risk assessment for suicidality? Using Joiner's [11] model in conjunction with the ICF [10] may be helpful in this endeavor. In practice, the clinician might begin by assessing for the three components of disability: (1) impairment in bodily function; (2) activity limitation; and/or (3) participation restriction. It is important to note that, particularly with the first component, inherent in assessing the various components of disability is at least a cursory assessment of cognitive impairments which could affect self-report of pre-existing vulnerabilities, details of the injury itself, and post-injury functioning, including risk factors for suicide. These cognitive impairments may include memory deficits and executive dysfunction. [19]

Considering disability and the military context, the next step of suicide risk assessment should involve examination of the presence of a client's desire for death, feelings of perceived burdensomeness, failed belongingness, and habituation to pain. Individuals can feel like a burden to family, friends, and/or society; it is therefore important to inquire about all of these aspects in order to obtain a complete picture of perceived burdensomeness. Assessing for failed belongingness involves asking individuals about attempts at establishing and maintaining interpersonal relationships with others. If they perceive these efforts as having been thwarted or having failed altogether, then they may have experienced failed belongingness. Of note is the importance of assessing how military-related culture and post-deployment issues could further impact feelings of burdensomeness and belongingness. Clinicians who are not familiar with the military or post-deployment-related issues are encouraged to learn about the conflicts in Afghanistan and Iraq and military efforts regarding community reintegration. One resource is Battlemind Training, [70] educational materials aimed at helping military personnel return to civilian life.

Lastly, assessing for a history of habituation to both physical and emotional pain will yield information that relates to the acquired ability to enact lethal self-injury. Clinicians could begin this conversation with their patients by asking about various contexts in which the individual has been exposed to physical and emotional pain. Using a concrete approach similar to a timeline, clinicians could ask patients about increased pain tolerance over the course of their lifetimes. For combat Veterans, asking about history of deployment and exposure to physical and psychological trauma may be of import. In the context of a desire for death, a history of habituation to pain would be expected to increase the risk for suicidal behavior.

When coupled with Joiner's [11] theory and the ICF [10] existing literature regarding post-TBI functioning may provide additional clinical strategies for assessing suicide risk in those with deployment-acquired TBI. Examples of two concepts, loss of sense of self post-injury [71] and hidden disability, [72] will be provided to highlight the potential utility of synthesizing these works. Nochi [71] studied narratives of those with TBI in an attempt to understand the concept of loss of sense of self, which he suggested was experienced in relation to both deconstructing the past (e.g., "Who was I before my TBI?") and constructing the present (e.g., "Who am I now that I have a TBI?"). He found that individuals may experience distress when they have difficulty reconciling the two. Also highlighted was the notion that the loss of sense of self post-injury was in part rooted in a discrepancy between how TBI survivors saw themselves versus how they were perceived by others. [71] One way of understanding the potential distress that this discrepancy may cause is via theories of self-verification and disintegration. [73,74] The former states that with regard to self-views, people seek and need verification from others; [73] the latter states that when people are not able to refute evidence that a tightly held belief about themselves is wrong, they experience significant emotional distress. [74] Thus, when people become aware that an important self-view is not shared by others, they may experience distress as well as an overall sense of failed belongingness. The idea of hidden disability [72] assumes that any outward physical injuries sustained have resolved and that there may be no lasting physical markers indicating that an individual has sustained brain damage with lasting sequelae. An individual's sense of burdensomeness may be increased if there is a need to ask for help despite a lack of visible signs of disability.

An exemplar case is provided below to highlight the potential interplay between Joiner's [11] theory and injury-related disability. In this scenario, a Soldier with a history of moderate TBI is coping with enduring symptoms in the form of cognitive dysfunction (e.g., impaired processing speed) that is not readily apparent to others. This Solider is no longer able to drive or work. S/he may feel like a burden secondary to decreased occupational functioning and increased dependence on others to meet his/her transportation-related needs (burdensomeness). Challenges may be further exacerbated by an increased sense of disconnection (failed belongingness) resulting from cognitively-based difficulties with understanding normally-paced conversations. If this Solider also endorses increased pain tolerance secondary to his/her injury history and trauma exposure, as well as the desire for death, suicidal behavior may be imminent.

By incorporating loss of sense of self, hidden disability, and the military context, one is able to obtain a more complete picture regarding the above-described Soldier's risk for suicide. Feelings of burdensomeness and failed belongingness may be fueled by activity limitation (driving) and participation restriction (working), which in turn can contribute to a

loss of sense of self, particularly given the hidden nature of this Soldier's disability. This loss may be compounded if the individual also experiences a loss of status and responsibility secondary to military discharge, which may be exacerbated if the Soldier had wished to remain in the military despite his/her injury. Above-described challenges regarding feeling disconnected from others may be heightened with the loss of the military environment and/or the presence of co-occurring post-traumatic symptoms.

Finally, any suicide risk assessment should include an evaluation of warning signs and safety (e.g., available means) as key components. Warning signs can best be described as precipitating emotions, thoughts, or behaviors to suicidal behavior. In contrast to the distal nature of suicide risk factors, warning signs are proximal to the suicidal behavior and imply imminent risk. [75] Readers are encouraged to review safety planning materials advocated by the VA. [76] Key elements of this process include the following: 1) recognizing warning signs; 2) using internal coping strategies; 3) identifying social contacts who may distract from the crisis; 4) indentifying family members or friends who may offer help to resolve a crisis; 5) contacting professionals and agencies; and 6) reducing the potential for use of lethal means. Inherent to this process is the idea that safety planning itself is a means of risk assessment; hence for some clients, the inability to conceptualize and implement a safety plan may suggest imminent risk. Attention to an individual's problem-solving and self-regulation abilities is crucial, particularly if the client has a history of cognitive impairment.

CONCLUSIONS

Interestingly, the themes regarding suicide risk from Joiner's model [11] map onto findings from the early literature [8,9] regarding deployment-acquired TBI and suicide discussed at the beginning of this chapter. Evidence for burdensomeness and failed belongingness can be found in the study by Vauhkonen, [9] who noted that familial distress and disability, including the inability to work (impairment/participation restriction) and financial difficulties (participation restriction) relate to suicide. Potential markers of habituation to pain can be found in the study by Achte et al, [8] whose results indicated pre-existing depression, psychosocial difficulties, and substance misuse in war veterans with a history of suicidality. Although research regarding deployment-acquired TBI and suicide is essentially in its infancy, seminal works in conjunction with current theory can assist in clarifying best assessment practices. Clinicians are encouraged to increase understanding regarding their clients' histories of pre-existing vulnerabilities and TBI-related disability [10] in the context of military experiences. Using the ICF [10] and Joiner's [11] theory as organizing frameworks may facilitate this process.

REFERENCES

[1] Kaplan MS, Huguet N, McFarland BH, Newsom JT. Suicide among male veterans: A prospective population-based study. *J Epidemiol Community Health*. 2007;61(7):619-624. Erratum in: *J Epidemiol Community Health.* 2007;61(8):751.

[2] Lorge E. Army responds to rising suicide rates. Army.Mil/News. http://www.army.mil/-news/2008/01/31/7222-army-responds-to-rising-suicide-rates/. Published January 31, 2008. Accessed March 25, 2009.

[3] Rand Corporation. *Invisible wounds of war: psychological and cognitive injuries, their consequences, and services to assist recovery.* In: Tanielian T, Jaycox LH, eds. Santa Monica, CA; 2008.

[4] Terrio H, Brenner LA, Ivins BJ, Cho JM, Helmick K, Schwab K, et al. Traumatic brain injury screening: Preliminary findings regarding prevalence and sequelae in a US Army Brigade Combat Team. *J Head Trauma Rehabil*. 2009;24(1):14-23.

[5] Simpson G, Tate R. Suicidality in people surviving a traumatic brain injury: Prevalence, risk factors and implications for clinical management. *Brain Inj*. 2007;21(13-14):1335-1351.

[6] Teasdale TW, Engberg AW. Suicide after traumatic brain injury: A population study. *J Neurol Neurosurg Psychiatry*. 2001;71(4):436-440.

[7] Wasserman L, Shaw T, Vu M, Ko C, Bollegala D, Bhalerao S. An overview of traumatic brain injury and suicide. *Brain Inj*. 2008;22(11):811-819.

[8] Achte KA, Lonnqvist J, Hillbom, E. Suicides following war brain-injuries. *Acta Psychiatr Scand.* 1971;225(suppl):1–94.

[9] Vauhkonen K. Suicide among the male disabled with war injuries to the brain. *Acta Psychiatr Neurol Scand*. 1959;(suppl 137):90–91.

[10] World Health Organization. *International classification of functioning, disability and health*. Geneva, Switzerland: World Health Organization; 2001.

[11] Joiner TE. *Why people die by suicide.* Cambridge, MA: Harvard University Press; 2005.

[12] Rutland-Brown W, Langlois JA, Thomas KE, Xi YL. Incidence of traumatic brain injury in the United States. *J Head Trauma Rehabil*. 2006;21(6):544-548.

[13] National Center for Injury Prevention and Control. What is traumatic brain injury? http://www.cdc.gov/ncipc/tbi/TBI.htm. Updated March 18, 2009. Accessed March 25, 2009.

[14] Gennarelli TA, Graham DI. Neuropathology. In: Silver JM, McAllister TW, Yudofsky SC, eds. *Textbook of traumatic brain injury.* Washington, DC: American Psychiatric Publishing, Inc; 2005;27-50.

[15] Ivins BJ, Schwab KA, Warden D, Harvey LT, Hoilien MA, Powell CO, Johnson CS, Salazar AM. Traumatic brain injury in US Army paratroopers: Prevalence and character. *J Trauma*. 2003;55:617-621.

[16] National Center for Injury Prevention and Control. *Report to Congress on Mild Traumatic Brain Injury in the United States: Steps to Prevent a Serious Public Health Problem*. Atlanta, GA: National Center for Injury Prevention and Control; 2003.

[17] Malec JF. Mild traumatic brain injury: Scope of the problem. In: Varney NR, Roberts RJ, eds. *The evaluation and treatment of mild traumatic brain injury.* Hillsdale, NJ: Lawrence Erlbaum Associates; 1999;15-37.

[18] Kay T, Harrington DE, Adams R, Anderson T, Berrol S. Definition of mild traumatic brain injury. *J Head Trauma Rehabil*. 1993;8:86-87.

[19] Lezak MD, Howieson DB, Loring DW. *Neuropsychological Assessment*. 4th ed. New York: Oxford University Press, Inc; 2004.

[20] Alexander M. Mild Traumatic Brain Injury: Pathophysiology, natural history, and clinical management. *Neurology.*1995;45(7):1253-1260.

[21] Oquendo MA, Friedman JH, Grunebaum MF, Burke A, Silver JM, Mann JJ. Suicidal behavior and mild traumatic brain injury in major depression. *J Nerv Ment Dis*. 2004;192(6):430-434.

[22] Ahmed I, Fujii D. Posttraumatic psychosis. *Semin Clin Neuropsychiatry*. 1998;3(1):23-33.

[23] Anstey KJ, Butterworth P, Jorm AF, Christensen H, Rodgers B, Windsor TD. A population survey found an association between self-reports of traumatic brain injury and increased psychiatric symptoms. *J Clin Epidemiol*. 2004;57(11):1202-1209.

[24] Hibbard MR, Uysal S, Kepler K, Bogdany J, Silver J. Axis I psychopathology in individuals with traumatic brain injury. *J Head Trauma Rehabil*. 1998;13(4):24-39.

[25] Robinson RG, Jorge R. Mood disorders. In: Silver JM, McAllister TW, Yudofsky SC, eds. *Textbook of traumatic brain injury*. Washington, DC: American Psychiatric Publishing, Inc.; 2005;201-212.

[26] Alderfer B, Arcinegas DB, Silver JM. Treatment of depression following traumatic brain injury. *J Head Trauma Rehabil.* 2005;20(6):544-562.

[27] Fann JR, Burington B, Leonetti A, Jaffe K, Katon W, Thompson RS. Psychiatric illness following traumatic brain injury in an adult health maintenance organization population. *Arch Gen Psych.* 2004;61(1):53-61.

[28] Fann JR, Leonetti A, Jaffe K, Katon WJ, Cummings P, Thompson, RS. Psychiatric illness and subsequent traumatic brain injury: A case control study. *J Neurol Neurosurg Psychiatry*. 2002;72(5):615-620.

[29] Miller NS, Adams BS. Alcohol and drug disorders. In: Silver JM, McAllister TW, Yudofsky SC, eds. *Textbook of traumatic brain injury*. Washington, DC: American Psychiatric Publishing, Inc.; 2005;509-529.

[30] Dikmen SS, Machamer JE, Powell JM, Temkin NR. Outcome 3 to 5 years after moderate to severe traumatic brain injury. *Arch Phys Med Rehabil*. 2003;84(10):1449-1457.

[31] Draper K, Ponsford J. (2008) Cognitive functioning ten years following traumatic brain injury and rehabilitation. *Neuropsychology.* 2008;22(5):618-625.

[32] Ponsford J, Draper K, Schönberger M. Functional outcome 10 years after traumatic brain injury: Its relationship with demographic, injury severity, and cognitive and emotional status. *J Int Neuropsychol Soc*. 2008;14(2):233-242.

[33] McCarthy ML, Dikmen SS, Langlois JA, Selassie AW, Gu JK, Horner MD. Self-reported psychosocial health among adults with traumatic brain injury. *Arch Phys Med Rehabil*. 2006;87(7):953-961.

[34] Pagulayan KF, Hoffman JM, Temkin NR, Machamer JE, Dikmen, SS. Functional limitations and depression after traumatic brain injury: Examination of the temporal relationship. *Arch Phys Med Rehabil.* 2008;89(10):1887-1892.

[35] Hibbard MR, Ashman TA, Spielman LA, Chun D, Charatz HJ, Melvin S. Relationship between depression and psychosocial functioning after traumatic brain injury. *Arch Phys Med Rehabil.* 2004;85(4)(Suppl 2):S43-53.

[36] Satz P, Forney DL, Zaucha K, Asarnow RR, Light R, McCleary C, et al. Depresison, cognition, and functional correlates of recovery outcome after TBI. *Brain Inj*. 1998;12(7):537-553.

[37] Peterson DB. International classification of functioning, disability and health: An introduction for rehabilitation psychologists. *Rehab Psychol*. 2005;50:105-112.
[38] Resnik LJ, Allen SM. Using international classification of functioning, disability and health to understand challenges in community reintegration of injured veterans. *J Rehabil Res Dev*. 2007;44(7):991-1006.
[39] Lew HL, Cifu DX, Sigford B, Scott S, Sayer N, Jaffee MS. Team approach to diagnosis and management of traumatic brain injury and its comorbidities. *J Rehabil Res Dev*. 2007;44(7):vii-xi.
[40] Warden D. Military TBI during the Iraq and Afghanistan wars. *J Head Trauma Rehabil*. 2006;21(5):398-402.
[41] Gondusky JS, Reiter MP. Protecting military convoys in Iraq: An examination of battle injuries sustained by a mechanized battalion during Operation Iraqi Freedom II. *Mil Med*. 2005;170(6):546-549.
[42] Cernak I, Savic J, Ignjatovic D, Jevtic M. Blast injury from explosive munitions. *J Trauma*. 1999;47(1):96-103.
[43] Cernak I, Wang Z, Jiang J, Bian X, Savic J. Cognitive deficits following blast injury-induced neurotrauma: Possible involvement of nitric oxide. *Brain Inj*. 2001;15(7):593-612.
[44] Schwab KA, Ivins B, Cramer G, Johnson W, Sluss-Tiller M, Kiley K, et al. Screening for traumatic brain injury in troops returning from deployment in Afghanistan and Iraq: Initial investigation of the usefulness of a short screening tool for traumatic brain injury. *J Head Trauma Rehabil*. 2007;22(6):377-389.
[45] Mayorga, MA. The pathology of primary blast overpressure injury. *Toxicology*. 1997;121(1):17-28.
[46] DePalma RG, Burris DG, Champion HR, Hodgson MJ. Blast injuries. *N Engl J Med*. 2005;352(13):1335-1342.
[47] Scott BA, Fletcher JR, Pulliam MW, Harris RD. The Beirut terrorist bombing. *Neurosurgery*. 1986;18(1):107-110.
[48] Defense and Veterans Brain Injury Center; Home of Defense and Veterans Head Injury Program. Patient Care. *http://www.dvbic.org/patientcare.php. Accessed April 2*, 2009.
[49] Hoge CW, McGurk D, Thomas JL, Cox AL, Engel CC, Castro CA. Mild traumatic brain injury in U.S. Soldiers returning from Iraq. *N Engl J Med*. 2008;358(5):453-463.
[50] Schneiderman AI, Braver ER, Kang HK. Understanding sequelae of injury mechanisms and mild traumatic brain injury incurred during the conflicts in Iraq and Afghanistan: Persistent postconcussive symptoms and posttraumatic stress disorder. *Am J Epidemiol*. 2008;167(12):1446-1452.
[51] King NS. PTSD and Traumatic Brain Injury: folklore and fact? *Brain Inj*. 2008;22(1):1-5.
[52] Merton, RK. The Matthew effect in science. The reward and communication systems of science are considered. *Science.* 1968;159(810):56-63.
[53] Preston SH, Hill ME, Drevenstedt GL. Childhood conditions that predict survival to advanced ages among African-Americans. *Soc Sci M.* 1998;47(9):1231-1246.
[54] Ferraro KF, Kelley-Moore, JA. *Cumulative disadvantage and health: Long-term consequences of obesity? Am Sociol Rev.* 2003;68(5):707-729.

[55] Morgan C, Kirkbride J, Hutchinson G, Craig T, Morgan K, Dazzan P, et al. Cumulative social disadvantage, ethnicity and first-episode psychosis: A case-control study. *Psychol Med*. 2008;38(12):1701-1715.

[56] O'Rand AM. The precious and the precocious: Understanding cumulative disadvantage and cumulative advantage over the life course. *Gerontologist*. 1996;36(2):230-238.

[57] Mościcki EK. Epidemiology of suicide. In: Jacobs DG, ed. *The Harvard Medical School guide to suicide assessment and intervention.* San Francisco: Jossey Bass Publishers; 1999;40-51.

[58] Maris RW, Berman AL, Silverman, MM. *Comprehensive textbook of suicidology.* New York: The Guilford Press; 2000.

[59] Beck AT, Steer R, Kovacs M, Garrison B. Hopelessness and eventual suicide: A 10-year prospective study of patients hospitalized with suicidal ideation. *Am J Psychiatry*. 1985;142(5):559-563.

[60] Jobes DA, Mann RE. Reasons for living versus reasons for dying: Examining the internal debate of suicide. *Suicide Life Threat Behav*. 1999;29(2):97-104.

[61] Crocker L, Clare L, Evans K. Giving up or finding a solution? The experience of attempted suicide in later life. *Aging Ment Health*. 2006;10(6):638-647.

[62] Crisp R. Personal responses to traumatic brain injury: A qualitative study. *Disabil Handicap Soc*. 1993;8(4):393-404.

[63] Rogers JR. Theoretical grounding: the missing link in suicide research. *Journal of Counseling and Development.* 2001;79(1):16-25.

[64] Joiner TE, Pettit JW, Walker RL, Voelz ZR, Cruz J, Rudd MD, et al. Perceived burdensomeness and suicidality: Two studies on the suicide notes of those attempting and those completing suicide *Journal of Social and Clinical Psychology,* 2002;21(5):531-545.

[65] Joiner TE, Rudd MD. Intensity and duration of suicidal crises vary as a function of previous suicide attempts and negative life events. *J Consult Clin Psychol*. 2000;68(5):909-916.

[66] Joiner TE, Rudd MD, Rouleau M, Wagner KD. Parameters of suicidal crises vary as a function of previous suicide attempts in youth inpatients. *J Am Acad Child Adolesc Psychiatry*. 2000;39(7):876-880.

[67] Cornette MM, Deboard R, Clark DC, Holloway RH, Brenner LA, Gutierrez PM, et al. *Examination of an interpersonal-behavioural model of suicide:* Toward greater specificity in suicide risk prediction. Poster session presented at: The International Association for Suicide Prevention Conference; August 2007; Dublin, Ireland.

[68] Cornette MM, deRoon-Cassini TA, Joiner TE, Proescher E. *Application of an interpersonal-behavioral model of suicide to returning OEF and OIF veterans.* Poster session presented at: The Association for the Advancement of Behavior Therapy Conference; November 2006; Chicago, IL.

[69] Brenner LA, Gutierrez PM, Cornette MM, Betthauser LM, Bahraini N, Staves PJ. A qualitative study of potential suicide risk factors in returning combat veterans. *Journal of Mental Health Counseling*, 2008*;*30(3):211-225.

[70] Walter Reed Army Institute of Research (WRAIR) U.S. Army Medical Research and Materiel Command. Battlemind Training II; Continuing the transition home. *https://www.battlemind.army.mil/assets/files/battlemind_training_ii.pdf. Accessed April 2*, 2009.

[71] Nochi M. "Loss of self" in the narratives of people with traumatic brain injuries: A qualitative analysis. *Soc Sci Med*. 1998;46(7):869-878.

[72] Goffman E. *Stigma: Notes on the management of spoiled identity*. New York: Simon & Schuster; 1963.

[73] Swann WB Jr. The trouble with change: self-verification and allegiance to the self. *Psychological Science*, 1997;8:177-180.

[74] Kohut H. *How Does Analysis Cure?* Goldberg A, Stepansky P, eds. Chicago: University of Chicago Press; 1984.

[75] Rudd, MD, Berman L, Joiner, Jr. TE, Nock MK, Silverman MM, Mandrusiak M, et al. Warning Signs for Suicide: Theory, Research, and Clinical Applications. *Suicide Life Threat Behav*. 2006;36(3):255-262.

[76] Stanley B, Brown GK, Karlin B, Kemp JE, VonBergen, HA. Safety Plan Treatment Manual to Reduce Suicide Risk: Veteran Version. *http://www.sprc.org /library/Veteran_Safety_Plan.pdf*. Published August 20, 2008. Accessed March 25, 2009.

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 15

PREVENTING SUICIDAL BEHAVIOR AFTER TRAUMATIC BRAIN INJURY

Arja Mainio
Oulu University Hospital, Oulu, Finland

ABSTRACT

TBI has a negative impact on somatic, cognitive and emotional/behavioral functions. To the victims and their families, psychosocial deficits and psychiatric disorders are commonly the major source of disability in their rehabilitation process. Pre-injury problems of TBI patients i.e., psychiatric disorders, pre-traumatic background in family circumstances, alcohol abuse, younger age, and lower socioeconomic status, have found to be associated with increased post-injury suicidality.

TBI increases a risk for life-time psychiatric disturbances such as depression, anxiety and aggressive behavior. Aggressiveness, history of psychiatric disorder and executive dysfunction are risk factors for suicidal behavior among TBI subjects. Traumatic brain injury *per se* has been found to be associated with elevated suicidal behavior, i.e. suicidal ideation, suicide attempts as well as completed suicide.

Previous literature indicates that there is no direct causality between TBI and suicide; the relation is more complex. The background of linking TBI to suicide has been hypothesized to be in a stress-diathesis model, or suicidality is suggested to be mediated via disinhibition and impulsivity in frontal lobe lesion.

The seriousness of injury is one of the most important risk factors for suicide at all ages for males and females alike. The other risk factors are substance abuse, psychiatric morbidity and aggressiveness, temporary or permanent cognitive and behavioral impairments, long-term psychosocial consequences such as unemployment, relationship breakdown and social isolation. Studies among TBI patients have not been able to evaluate the temporally specific risk period for suicide after TBI.

There are no specific guidelines available for suicide prevention in patients suffering from the post-injury consequences of TBI. General practitioners have a central role following up people with TBI in suicide prevention. An important component for suicide prevention in general is training frontline staff knowledge and skills in suicide assessment and management. The major challenge in suicide prevention is treatment of post-TBI depression. Psychiatric consultation is recommended especially for those with unsuccessful adaptation process due to TBI. Crisis intervention, problem-solving

therapies, and cognitive behavior therapy (CBT) are therapies for choice in psychiatric treatment.

INTRODUCTION

The definition of traumatic brain injury (TBI) describes TBI as a traumatically induced structural injury and/or physiological disruption of brain function as a result of an external force. A penetrating brain injury occurs when a sharp object or bone penetrates the dural lining surrounding the brain. In closed injury, forces acting on the head cause damage to the brain. (1). Concussions or mild injuries comprise about 80% of all traumatic brain injuries. 10%–15% remain symptomatic in the longer term with a persisting post-concussion syndrome (2).

At least one of the following clinical signs has to be indicated after a traumatic event as described by French & Parkinson 2008:

1. Any period of loss of or a decreased level of consciousness
2. Any loss of memory for events immediately before or after the injury
3. Any alteration in mental state at the time of injury
4. Neurological deficits that may or may not be transient
5. Intracranial abnormalities

TBI has a negative impact on somatic, cognitive and emotional/behavioral functions (3). Somatic consequences include neurological deficits, headache, sleep disturbances, vision or speech problems, fatigue, seizures, or balance dysfunction (3,4). Cognitive dysfunction appears with a wide range of symptoms, such as dysfunction in executive function (motivation, ability to initiate behaviors or to self-monitor), attentional impairment, reduced processing speed, memory problems, or language difficulties. (5) These disturbances are related to the severity of injury and increase according to the severity of injury.

Emotional or behavioral symptoms include depression, anxiety, irritability, impulsivity, or disinhibition. (6,7). To the victims and their families, psychosocial deficits and psychiatric disorders are commonly the major source of disability (8). The psychosocial problems associated with decreased social contact, depression, and loneliness that occur for many with traumatic brain injury (TBI) create a major challenge for enhancing efforts at community re-entry (9).

PRE-INJURY PROBLEMS

According to a case control study comparing TBI patients to those without TBI, psychiatric disorders are indicated to be associated with an increased risk for TBI (10). Furthermore, in a retrospective cohort of veterans, depression, anxiety and conduct disorder have been associated with future risk of developing TBI (11). It has also been found that a history of psychiatric disorders before TBI may comprise a special risk for depressive disorder after TBI (12). However, specific links between pre-morbid psychiatric/emotional

distress and post-injury suicidal ideation or post-injury suicide attempts have not yet been pointed out in literature (13,14).

Achté and co-authors studied the prevalence of suicide in a large study of brain-injured men (6,498) with TBI sustained in the war (15). They found that the pre-traumatic background of suicide victims had been incompetent. The most important pre-traumatic factors with a bearing on the development that led to suicide included deprivations experienced in childhood and youth, particularly the loss of a parent or a broken home in general. Further, psychic disorders, dependence, contact difficulties, withdrawal and aggressiveness or indifference towards other people and disturbances in interpersonal relationships during childhood were associated with completed suicide among the TBI suicide victims (15). The other known risk factors for TBI are age 15-24 years, male sex, alcohol abuse, and lower socioeconomic status (16).

POST-INJURY PSYCHIATRIC DISORDERS

Several studies indicate a life-time risk for psychiatric disorders following traumatic brain injury, i.e. depression, bipolar disorder, anxiety, psychosis and substance use, as well as personality disorders (8, 17-20). High rates of psychiatric disorders among patients with TBI could be due to the effects of brain dysfunction, the psychological effect of the accident, or the psychosocial consequences of injury (8). Psychiatric disorders associated with TBI comprise a special risk for suicide. In a general population study, about 90% of those committing suicide had any psychiatric disorder, 63% had depression and 43% alcohol dependence or use (21).

Depression

Major depression is the most studied post-traumatic psychiatric disorder (20). The prevalence of post-injury depression has varied from 14% to 50% (12,15,18,20,22-24). Depressive TBI patients have been shown to have more often a history of mood and anxiety disorders compared to patients without major depression (12). Patients with major depression exhibited comorbid anxiety (76.7%) and aggressive behavior (56.7%). Patients with major depression had significantly greater impairment in executive functions than their non-depressed controls (22). Aggressiveness, history of psychiatric disorder and executive dysfunction are risk factors for suicidal behavior among TBI subjects (8,15,25-26).

Post-Traumatic Stress Disorder (PTSD)

Prevalence rates for post-traumatic stress disorder among TBI patients have been found to range from 3% to 28% (17,27,28). These findings indicate that PTSD can develop especially after severe traumatic brain injury. The predominance of emotional reactivity and the relative absence of traumatic memories in patients with PTSD who suffered impaired consciousness during trauma can develop into PTSD (27). Among war veterans, mild TBI

caused by bullets/shrapnel, blasts, motor vehicle crashes, air/water transport, and falls has been shown to be associated with PTSD especially in females and those with multiple injury mechanisms and mild TBI. (29). Contrary to this, some studies indicate that TBI does not produce PTSD, since victims of accidents are unlikely to develop PTSD if the impact to the head resulted in an extended period of unconsciousness (30,31). In general, an increased risk for suicide has been found among PTSD patients due to several maladaptive schemas in correlation with both suicidal ideation and the presence of a suicide plan in these patients (32) There are also putative findings that war veterans with PTSD in older and younger age groups are more prone to suicide compared to middle-aged veterans (33).

SUICIDAL BEHAVIOR

Traumatic brain injury has been found to be associated with elevated suicidal behavior, i.e. suicidal ideation, suicide attempts as well as completed suicide (3,8,14,25). Executive dysfunction is suggested to be a possible neuropsychiatric mechanism behind both TBI and risk for suicidality (10). However, the association between TBI and suicidality is not sufficiently resolved (26). The background of linking TBI to suicide has been hypothesized to be in a stress-diathesis model, or suicidality is suggested to be mediated via disinhibition and impulsivity in frontal lobe lesion (34). Further, the neuropathological changes caused by TBI may lead to deactivation of lateral and dorsal prefrontal cortices and increased activation of ventral limbic and paralimbic structures (26). In persons with no brain damage, serotonergic hypofunction, particularly in the basal orbital region of the prefrontal cortex, has been shown to be associated with elevated suicide risk (35,36). Among subjects with TBI, suicidal behavior is suggested to be mediated by a complex etiological mechanism, not only via the serotonergic system (34)

SUICIDAL IDEATION AND SUICIDE ATTEMPTS

Suicidal ideation has been found in up to 23% of the persons with a history of TBI (3,13,37). Table 1 presents the prevalence of suicidal attempts in different samples (3,8,13,34,38). There are significantly higher rates of suicide attempts among TBI survivors compared to those without TBI (8,34). Aggression and hostility among TBI subjects has been suggested to predict the risk of suicide attempts (34).

In general population the prevalence of suicide attempts is higher in females than in males, yet mortality from suicide is typically lower among females compared to males (40,41). However, males with TBI have an increased likelihood of suicide attempts compared to those without TBI (34). Medicine overdoses have been shown to be the major method for attempting suicide in people with TBI, accounting for 50% to 62% of the total number of attempts in the clinical samples (39,42). The other methods used are cutting, in about 17% of attempters, the rest being miscellaneous means (39,42). The overdose method is readily available since medical treatment has been shown to be used by 63% of TBI patients. Firearms were not used for suicide attempts in either of the studies, although the study of

Gutierrez and colleagues was conducted among veterans. Further, almost half of the subjects had recurrent (range 2-7) attempts after a traumatic event. (39,42)

Table 1 Suicide attempts in patients with TBI.

Study	Prevalence (%) of suicide attempts	Injury severity	Sample size	Country	Measure
Klonoff and Lage 1995	2	not reported	11		Clinical report
Silver et al 2001	8	severe	361	USA	Single item
Simpson & Tate 2002	22	mild-severe	172	Australia	Beck Scale for Suicide ideation
Oquendo et al 2004	60	mild	325 depressed subjects	USA	Columbia Suicide History Form
Gutierrez PM et al 2008	22	mild to severe	22 veterans	USA	Lethality of Suicide Attempt Rating Scale

Table 2. Suicides among patients with TBI

Study	Study design	Injury severity	Sample size	Country	Prevalence (%) of suicide
TBI samples					
Achté et al 1971	War veterans with TBI	mild-severe	6,498	Finland	1.3
Klonoff & Lage 1995	TBI patients	mild-severe	111		1.8
Tate et al 1997	TBI patients		896	Australia	0.9
Teasdale et al 2001	TBI sample in hospital register	mild-severe mild-severe	167,083	Denmark	0.59% for concussion 0.61% for cranial fracture 0.84% for contusion or traumatic intracranial hemorrhage
Harrison-Felix C et al 2006	TBI patients	mild-severe	2,140	United states	1
Suicide sample					
Mainio et al 2007	Suicide victims	mild-severe	1,877	Finland	5.5 TBI subjects

COMPLETED SUICIDE

Table 2 presents the prevalence of suicide in different study samples (15,25,38,43-45). It has been found that the people with TBI are between 2.7 and 4 times more likely to commit suicide compared with general population matched for age and gender (25). Depending on the type of injury, i.e. concussion, cranial fracture and cerebral contusion/traumatic intracranial hemorrhage, the rates of suicide have been found to be 3.0, 2.7 and 4.1 times higher, respectively, than in the general population (25). Females with traumatic brain lesions have had higher rates of suicide than males, although suicide rates are in general higher among males. It has been suggested that TBI may cause more psychosocial disadvantage among women than among men. In women, TBI is suggested to have a greater impact on their sense of personal attractiveness and self-esteem, leading to suicidal behavior (25).

The most frequently used method of suicide in an older study conducted in the 1970s was self-poisoning (15), while a diverse range of methods was used in a study performed in the 1990s (43) and non-violent suicide methods were used in a recent (2007) study of suicide victims with severe TBI (45). Further, Desai and co-workers (2008) investigated suicide in a study sample of veterans. They found that discharged psychiatric inpatients who were male, Caucasian and had substance abuse or post-traumatic stress disorder were significantly more often likely to commit suicide with a firearm compared to other methods (46). The great majority of suicides among persons with TBI is suggested to be premeditated, rather than the result of an impulsive act (2,15)

RISK FACTORS FOR SUICIDALITY

Previous literature indicates that there is no direct causality between TBI and suicide; the relation is more complex and in fact they share many common risk factors: young age, male gender (16,47), substance abuse, psychiatric morbidity and aggressiveness (2,8,25,37), temporary or permanent cognitive and behavioral impairments, long-term psychosocial consequences such as unemployment, relationship breakdown and social isolation (26,48,49). Mortality rates for suicide have been shown to be elevated among those TBI patients whose injuries were sustained at ages between 20 and 60 compared to those injured at a younger or older age (25).

Substance Use

Patients with a traumatic brain injury are likely to have a history of substance abuse and they often suffer from personality pathology (34). They are also at high risk to get alcohol-related disorders after TBI. The prevalence of substance abuse or dependence has been found to be present in 5%-28% of TBI subjects as a post-injury disorder (17,18,23). Co-morbid substance abuse among TBI patients increases the risk of suicide in both males and females (25). The presence of alcohol abuse is shown to be associated with accelerated suicide process in the suicide victims with mild to severe TBI (45).

Severity of TBI

The seriousness of injury is one of the most important risk factors for suicide at all ages for males and females alike (15,25,38). However, the 2002 study of Simpson and Tate found no relationship between severity of head injury and increased suicidality post-injury (13). The localization of lesion or greater impulsivity by frontal lesion has not been shown to be associated with a greater risk of suicide (15,25).

The greater risk for suicide in severe TBI compared to mild TBI is suggested to be associated with injury sequelae, such as the psychological reaction to social isolation, the identity crisis following the traumatic event, and reduced adaptive abilities (2,25).

However, it must be emphasized that people with TBI are at risk of suicide regardless of the degree of injury severity (13,45).

Risk Period

Previous studies among TBI patients have not been able to evaluate the temporally specific risk period for suicide after TBI (15,25,43). Teasdale & Engberg found the median times from injury to suicide to be about 3-3.5 years after injury, but they did not find evidence for a specific risk period for suicide post-injury (25). A study with suicide completers found the risk period for suicide among suicide victims with TBI and with comorbid psychiatric disorder (depression or substance misuse) to be about three years after traumatic injury (45). Suicidal crisis may occur many years after the injury. In the follow-up after a traumatic event, traumatic brain injury comprises a constant, increased risk for suicide lasting up to 15 years (15,25,39,43,45). If a person with TBI has been admitted to psychiatric hospital the risk period of suicide is estimated to be within three months after discharge. It is thought that the association of suicide with TBI is based more on the pre-morbid or concomitant characteristics of the person than the head injury *per se* (25).

Premorbid Personality

Pre-morbid personality has been suggested as being one of the most remarkable predicting factors for a higher risk of suicide among TBI subjects (25). Further, when subjects with TBI have a post-TBI history of psychiatric symptoms and substance misuse the risk for suicide attempts is as much as 21 times higher compared to those without post-TBI history of psychiatric problems (42).

Suicidal Behavior

In general, suicidal behavior is part of the suicidal process, anticipating the risk to commit suicide. The suicidal process can be described as a progressive process ending in completed suicide. Hopelessness, suicide ideations and suicide attempts have been found to be the indicators for suicide. In general, attempted suicide is known to be the greatest predictor of completed suicide (50). Suicidal ideations have been found to precede suicide attempts (13). Further, suicidal ideations as well as suicide attempts have predicted completed suicide in a significant proportion of people with TBI and could be found several months before actual deaths (15,43).

PREVENTING SUICIDE

Since there are no specific guidelines available for suicide prevention in patients suffering from the post-injury consequences of TBI the existing general guidelines must be used (51,52).

The warning signs anticipating a probable suicide attempt or completed suicide are found to be as follows:

1. Depression/ Hopelessness: patients self-report symptoms of depressive mood.
2. Relationship conflict: disagreements with close relations or friends.
3. Relationship breakdown: divorce or separation from relatives.
4. Instrumental difficulties: patients have work difficulties, insufficiency of finance, legal problems.
5. Social isolation: loneliness, deprivation of friends or close people.
6. Pressure of multiple stressors: specific or non-specific reason for an overwhelming experience of distress.
7. Global impact of injury: non-specific: feelings of global impossibility to treat the brain injury. (53)

Table 3. Suicide prevention strategies for general practitioners managing patients with traumatic brain injury*

Level of intervention	Clinical management
Universal	
All people with TBI	Assess hopelessness and suicide ideation proactively, using indirect or direct approaches. Monitor for warning signs that may increase risk level. Recognize that people may be at risk regardless of time post-injury. Make provision for the availability of long term support. Monitor males and females equally.
Selected	
People with TBI in "at-risk" groups	Treat people with depressive or substance misuse conditions Monitor people with comorbid psychiatric conditions and those injured as the result of a suicide attempt.
Indicated	
People with TBI for whom suicide is an identified issue (e.g. made attempt, expressed suicide ideation)	Reduce the lethality of the environment. Provide frontline treatments (pharmacotherapy) In managing someone with a history of any attempts, plan for the possibility that people may use more than one method. Provide support/monitor for at least 12 months after a suicide attempt. Closely monitor in the months after discharge from psychiatric hospital.

* The United States Institute of Medicine generic suicide prevention model (54)

Due to the fact that depression, substance abuse, TBI and suicide are highly associated each other, psychic symptoms and alcohol consumption should be screened at a very low threshold among those with a history of even mild TBI. The main principles for suicide prevention are shown in Table 3 (54).

Universal Level

At the universal level, general practitioners have a central role following up people with TBI (53). It has been found that social support and monitoring after TBI is important. Assertive follow-up lasting for years after TBI with several home visits has been shown to decrease patients' depressive symptoms significantly (55). Active screening for depression, hopelessness or suicidality may also find those at increased risk for suicide (56,57) An important component for suicide prevention in general is training frontline staff knowledge and skills in suicide assessment and management (53,57). There are many national suicide prevention training programs, as reviewed by Simpson and Tate 2007 (53). Specialist brain injury services can also contribute to this screening and get the close relations and family members of TBI patients involved (57). Special monitoring and social support should be given to people exhibiting a broad spectrum of emotional/psychiatric disturbance, and ways of countering widespread hopelessness after TBI should be explored (13).

Selected Level

At the level of selected interventions for suicide prevention the major challenge is treatment of post-TBI depression. As reviewed by Alderefer and colleagues (2005), it has been recommended that posttraumatic depression should be followed and treated by non-pharmacologic means (58). However, in most cases psychosocial intervention is not adequate or effective in the treatment of depression, and pharmacotherapy is needed (58,59). Selective serotonin reuptake inhibitors (SSRIs) are recommended as the first-line agents for the treatment of post-TBI depression (58). Sertraline has been shown to be one of the most widely used SSRIs among patients with TBI thanks to its good efficacy and tolerability (60,61). The other SSRIs that have been used in the treatment of post-TBI depression are fluoxetine, paroxetine, citalopram, escitalopram and fluvoxamine (62-64). Further, when SSRIs fail to attain remission in post-TBI depression, augmentation with a psychostimulant i.e. methylphenidate, may be a method of choice (65,66). The benefits of using methylphenidate also include improved cognitive function and maintenance of daytime alertness (66). If other antidepressive pharmacotherapy besides SSRIs is needed, the use of tricyclic antidepressants (TCAs), i.e. nortriptyline or desipramine, should be considered (67). Adverse events must be carefully checked when using TCAs (68). The newer antidepressants, such as venlafaxine and mirtazapine, are well-known in common clinical practice, but due to the absence of research data on the treatment of depression among TBI patients their use must be undertaken with caution (58,69). There is also a clear need for further well-designed randomized controlled trials in the treatment of depression after TBI in order to establish definitive treatment standards for this patient population (70).

Indicated Level

At the level of indicated interventions a full clinical intervention for those suggested to be at special risk for suicide is justified (38). There are some clinical instruments for the assessment of possible suicide such as the Suicide Intent Scale (71) or Lethality of Suicide Attempt Rating Scale (72). When screening for possible suicidality, every effort has to be made to prevent the death of patients. There are also specific staff training workshops for suicide prevention among patients with traumatic brain injury. This way, staff can intervene to prevent the unsuccessful adaptation process of patients which may result in completed suicide (73). One important way of decreasing the possibility of suicide in those at risk is a conservative approach reducing the lethality of the environment, e.g. by limiting access to firearms or toxic medicine.

In addition to pharmacotherapy, as used at the *selected level* of suicide prevention, the need for psychotherapeutic approaches is warranted in suicide prevention. Psychiatric consultation is thus highly recommended for the depressive TBI patients, and especially for those with unsuccessful adaptation process. It is known that persons with TBI are emotionally sensitive and do not know how to cope with it. They may have a large amount of internalized aggression, hostility and negativity, while their problem-solving skills are diminished (3,12). They may show concrete thoughts and have decreased intellectual and neuropsychological resources to cope with their surroundings (3). The use of maladaptive coping strategies following traumatic brain injury will lead to hopelessness in the patients' mind and predict the possibility of committing suicide as a pathological coping strategy. From a psychiatric point of view it is important to go through the grieving process with the help of which patients can handle the significant change that has occurred in their lives due to TBI, realizing the decreased level of physical, emotional and intellectual challenge (13). Problem-solving therapies and cognitive behavior therapy (CBT) have also been used in TBI patients in order to remediate the effects in executive functions and to help them understand and cope better with emotional issues (73-75).

The links between pre-injury psychiatric problems/substance abuse as well as post-injury psychiatric problems with such psychopathology that will lead to suicidal behavior need further studies. It is very assumable that there are multiple pathways from pre-injury factors/personality traits to post-injury suicide among TBI patients. In fact, the majority of subjects with TBI never have any suicidal behavior at all. However, before more studies on specific suicide prevention programs for TBI patients are undertaken, it is important to treat depression, PTSD and alcohol disorder among TBI patients in order to minimize risk factors known to be associated with elevated suicide risk in general population

REFERENCES

[1] French LM, Parkinson GW. Assessing and treating veterans with traumatic brain injury. *J Clin Psychol* 2008;64(8):1004-1013.

[2] Simpson G, Tate R. Suicidality in people surviving a traumatic brain injury: prevalence, risk factors and implications for clinical management. *Brain Inj* 2007 Dec;21(13-14):1335-1351.

[3] León-Carrión J, De Serdio-Arias ML, Cabezas FM, Roldán JM, Domínguez-Morales R, Martín JM, Sanchez MA. Neurobehavioural and cognitive profile of traumatic brain injury patients at risk for depression and suicide. *Brain Inj* 2001;5(2):175-181.

[4] Schwab KA, Ivins B, Cramer G, Johnson W, Sluss-Tiller M, Kiley K, Lux W, Warden D. Screening for traumatic brain injury in troops returning from deployment in Afghanistan and Iraq: initial investigation of the usefulness of a short screening tool for traumatic brain injury. *J Head Trauma Rehabil* 2007;22(6):377-389.

[5] Lux WE. A neuropsychiatric perspective on traumatic brain injury. *J Rehabil Res Dev* 2007;44(7):951-962.

[6] Ponsford J, Draper K, Schönberger M. Functional outcome 10 years after traumatic brain injury: its relationship with demographic, injury severity, and cognitive and emotional status. *J Int Neuropsychol Soc* 2008;14(2):233-242.

[7] Schneiderman AI, Braver ER, Kang HK. Understanding sequelae of injury mechanisms and mild traumatic brain injury incurred during the conflicts in Iraq and Afghanistan: persistent postconcussive symptoms and posttraumatic stress disorder. *Am J Epidemiol* 2008;167(12):1446-1452.

[8] Silver JM, Kramer R, Greenwald S, Weissman M. The association between head injuries and psychiatric disorders: findings from the New Haven NIMH Epidemiologic Catchment Area Study. *Brain Inj* 2001;15(11):935-945.

[9] Morton MV, Wehman P. Psychosocial and emotional sequelae of individuals with traumatic brain injury: a literature review and recommendations. *Brain Inj* 1995;9(1):81-92.

[10] Fann JR, Leonetti A, Jaffe K, Katon WJ, Cummongs P, Thompson RS. Psychiatric illness and subsequent traumatic brain injury: a case control study. *J Neurol Neurosurg Psychiatry* 2002;72:615-620.

[11] Vassallo JL, Proctor-Weber Z, Lebowitz BK, Curtiss G, Vanderploeg RD. Psychiatric risk factors for traumatic brain injury. *Brain Inj* 2007;21(6):567-573.

[12] Fedoroff JP, Starkstein SE, Forrester AW, Geisler FH, Jorge RE, Arndt SV, Robinson RG. Depression in patients with acute traumatic brain injury. *Am J Psychiatry* 1992;149(7):918-923.

[13] Simpson G, Tate R. Suicidality after traumatic brain injury: demographic, injury and clinical correlates. *Psychol Med* 2002 May;32(4):687-697.

[14] Kishi Y, Robinson RG, Kosier JT. Suicidal ideation among patients with acute life-threatening physical illness: patients with stroke, traumatic brain injury, myocardial infarction, and spinal cord injury. *Psychosomatics* 2001;42(5):382-390.

[15] Achté KA, Lönnqvist J, Hillbom E. Suicides following war brain-injuries. *Acta Psychiatr Scand Suppl* 1971;225:1-94.

[16] Kraus JF, McArthur DL. Epidemiologic aspects of brain injury. *Neurol Clin* 1996;14(2):435-450.

[17] Hibbard MR, Uysal S, Kepler K, Bogdany J, Silver J. Axis I psychopathology in individuals with traumatic brain injury. *J Head Trauma Rehabil* 1998;13(4):24-39.

[18] Deb S, Lyons I, Koutzoukis C, Ali I, McCarthy G. Rate of psychiatric illness 1 year after traumatic brain injury. *Am J Psychiatry* 1999;156:374-378.

[19] Holsinger T, Steffens DC, Phillips C, Helms MJ, Havlik RJ, Breitner JC, Guralnik JM, Plassman BL. Head injury in early adulthood and the lifetime risk of depression. *Arch Gen Psychiatry* 2002;59(1):17-22.

[20] Koponen S, Taiminen T, Portin R, Himanen L, Isoniemi H, Heinonen H, Hinkka S, Tenovuo O. Axis I and II psychiatric disorders after traumatic brain injury: a 30-year follow-up study. *Am J Psychiatry* 2002;159(8):1315-1321.

[21] Lönnqvist JK, Henriksson MM, Isometsä ET, Marttunen MJ, Heikkinen ME, Aro HM, Kuoppasalmi KI. Mental disorders and suicide prevention. *Psychiatry Clin Neurosci* 1995;49 Suppl 1:S111-116.

[22] Jorge RE, Robinson RG, Moser D Tateno A, Crespo-Facorro B, Arndt S. Major depression following traumatic brain injury. *Arch Gen Psychiatry* 2004;61:42-50.

[23] Fann JR, Burington B, Leonetti A, Jaffe K, Katon WJ, Thompson RS. Psychiatric illness following traumatic brain injury in an adult health maintenance organization population. *Evid Based Ment Health* 2004;7(3):88.

[24] Rapoport MJ, Kiss A, Feinstein A. The impact of major depression on outcome following mild-to- moderate traumatic brain injury in older adults. *J Affect Disord* 2006;92(2-3):273-276.

[25] Teasdeale TW, Engberg AW. Suicide after traumatic brain injury: a population study. J Neurol Neurosurg Psychiatry 2001;71:436-440.

[26] Wasserman L, Shaw T, Vu M, Ko C, Bollegala D, Bhalerao S. An overview of traumatic brain injury and suicide. *Brain Inj* 2008;22:811-819.

[27] Bryant RA, Marosszeky JE, Crooks J, Gurka JA. Posttraumatic stress disorder after severe traumatic brain injury. *Am J Psychiatry* 2000;157(4):629-631.

[28] Glaesser J, Neuner F, Lütgehetmann R, Schmidt R, Elbert T. Posttraumatic Stress Disorder in patients with traumatic brain injury. *BMC Psychiatry* 200;4:5.

[29] Schneiderman AI, Braver ER, Kang HK. Understanding sequelae of injury mechanisms and mild traumatic brain injury incurred during the conflicts in Iraq and Afghanistan: persistent postconcussive symptoms and posttraumatic stress disorder. *Am J Epidemiol* 2008;167(12):1446-1452.

[30] Bombardier CH, Fann JR, Temkin N, Esselman PC, Pelzer E, Keough M, Dikmen S. Posttraumatic stress disorder symptoms during the first six months after traumatic brain injury. *Neuropsychiatry Clin Neurosci* 2006;18(4):501-508.

[31] Sbordone RJ, Liter JC. Mild traumatic brain injury does not produce post-traumatic stress disorder. *Brain Inj* 1998;12:265-267.

[32] Dutra L, Callahan K, Forman E, Mendelsohn M, Herman J. Core schemas and suicidality in a chronically traumatized population. *J Nerv Ment Dis* 2008;196(1):71-74.

[33] Zivin K, Kim HM, McCarthy JF, Austin KL, Hoggatt KJ, Walters H, Valenstein M. Suicide mortality among individuals receiving treatment for depression in the Veterans Affairs health system: associations with patient and treatment setting characteristics. *Am J Public Health* 2007;97(12):2193-2198.

[34] Oquendo MA, Friedman JH, Grunebaum MF, Burke A, Silver JM, Mann JJ. Suicidal behavior and mild traumatic brain injury in major depression. *J Nerv Ment Dis* 2004;192(6):430-434.

[35] Arango V, Underwood MD, Mann JJ.Serotonin brain circuits involved in major depression and suicide. *Prog Brain Res* 2002;136:443-453.

[36] Mann JJ, Huang YY, Underwood MD, Kassir SA, Oppenheim S, Kelly TM, Dwork AJ, Arango V. A serotonin transporter gene promoter polymorphism (5-HTTLPR) and prefrontal cortical binding in major depression and suicide. *Arch Gen Psychiatry* 2000;57(8):729-738.

[37] Anstey KJ, Butterworth P, Jorm AF, Christensen H, Rodgers B, Windsor TD. A population survey found an association between self-reports of traumatic brain injury and increased psychiatric symptoms. *J Clin Epidemiol* 2004;57(11):1202-1209.
[38] Klonoff PS, Lage A. Suicide in patients with traumatic brain injury: risk and prevention. *J Head Trauma Rehabil* 1995;10:16-24.
[39] Gutierrez PM, Brenner LA, Huggins JA. A preliminary investigation of suicidality in psychiatrically hospitalized veterans with traumatic brain injury. *Arch Suicide Res* 2008;12:336-343.
[40] Canetto SS, Sakinofsky I. The gender paradox in suicide. *Suicide Life Threat Behav* 1998;28(1):1-23.
[41] Dahlen ER, Canetto SS. The role of gender and suicide precipitant in attitudes toward nonfatal suicide behavior. *Death Stud* 2002;26(2):99-116.
[42] Simpson G, Tate R. Clinical features of suicide attempts after traumatic brain injury. *J Nerv Ment Dis 2*005;193(10):680-685.
[43] Tate R, Simpson G, Flanagan S, Coffey M Completed suicide after traumatic brain injury. *J Head Trauma Rehabil* 1997;12:16-28.
[44] Harrison-Felix C, Whiteneck G, Devivo MJ, Hammond FM, Jha A. Causes of death following 1 year postinjury among individuals with traumatic brain injury. *J Head Trauma Rehabil* 2006;21(1):22-33.
[45] Mainio A, Kyllönen T, Viilo K, Hakko H, Särkioja T, Räsänen P. Traumatic brain injury, psychiatric disorders and suicide: a population-based study of suicide victims during the years 1988-2004 in Northern Finland. *Brain Inj* 2007;21(8):851-855.
[46] Desai RA, Dausey D, Rosenheck RA. Suicide among discharged psychiatric inpatients in the Department of Veterans Affairs. *Mil Med* 2008;173:721-728.
[47] Tate RL, McDonald S, Lulham JM. *Incidence of hospital-treated traumatic brain injury in an Australian community.* Aust N Z J Public Health 1998;22(4):419-423.
[48] Gomez-Hernandez R, Max JE, Kosier T, Paradiso S, Robinson RG. Social impairment and depression after traumatic brain injury. *Arch Phys Med Rehabil* 1997;78(12):1321-1326.
[49] Olver JH, Ponsford JL, Curran CA. Outcome following traumatic brain injury: a comparison between 2 and 5 years after injury. *Brain Inj* 1996;10(11):841-848.
[50] Suominen K, Isometsä E, Ostamo A, Lönnqvist J. Level of suicidal intent predicts overall mortality and suicide after attempted suicide: a 12-year follow-up study. *BMC Psychiatry* 2004;4:11.
[51] American Psychiatric Association: *Practice guidelines for the assessment and treatment of patients with suicidal behaviours*. Washington, DC: American Psychiatric Association; 2003.
[52] National Institute for Clinical Excellence. *Self-harm: The short-term physical and psychological management and secondary prevention of self-harm in primary and secondary care.* London: National Institute for Clinical Excellence; 2003.
[53] Simpson GK, Tate RL. Preventing suicide after traumatic brain injury: implications for general practice. *Med J Aust* 2007;187(4):229-232.
[54] Mrazek PJ, Haggerty RJ, editors; Committee on Prevention of Mental Disorders, Institute of Medicine. *Reducing risks of mental disorders: frontiers of intervention research.* Washington, DC: National Academy Press, 1994.

[55] Powell J, Heslin J, Greenwood R. Community based rehabilitation after severe traumatic brain injury: a randomised controlled trial. *J Neurol Neurosurg Psychiatry* 2002;72(2):193-202.
[56] Burless C, De Leo D. Methodological issues in community surveys of suicide ideators and attempters. *Crisis* 2001;22:108-123.
[57] Kuipers P, Lancaster A. Developing a suicide prevention strategy based on the perspective of people with brain injuries. *J Head Trauma Rehabil* 2000;15:1275-1284.
[58] Alderfer BS, Arciniegas DB, Silver JM. Treatment of depression following traumatic brain injury. *J Head Trauma Rehabil* 2005;20(6):544-562.
[59] Menzel JC. Depression in the elderly after traumatic brain injury: a systematic review. *Brain Inj* 2008;22(5):375-380.
[60] Fann JR, Uomoto JM, Katon WJ. Sertraline in the treatment of major depression following mild traumatic brain injury. *J Neuropsychiatry Clin Neurosci* 2000;12(2):226-232.
[61] Turner-Stokes L, Hassan N, Pierce K, Clegg F. Managing depression in brain injury rehabilitation: the use of an integrated care pathway and preliminary report of response to sertraline. *Clin Rehabil* 2002;16(3):261-268.
[62] Cassidy J. Fluoxetine: a new serotonergically active antidepressant. *J Head Trauma Rehabil* 1989;4:67-69
[63] Rickels K, Schwiizer E. Clinical overview of serotonin reuptake inhibitors. *J Clin Psychiatry* 1990;51(suppl B):9-12.
[64] Perino C, Rago R, Cicolini A, Torta R, Monaco F: Mood and behavioural disorders following traumatic brain injury: clinical evaluation and pharmacological management. *Brain Inj* 2001;15(2):139-148.
[65] Gualtieri CT, Evans RW. Stimulant treatment for the neurobehavioural sequelae of traumatic brain injury. Brain Inj 1988;2(4):273-290.
[66] Lee H, Kim SW, Kim JM, Shin IS, Yang SJ, Yoon JS. Comparing effects of methylphenidate, sertraline and placebo on neuropsychiatric sequelae in patients with traumatic brain injury. *Hum Psychopharmacol* 2005;20(2):97-104.
[67] Wroblewski BA, Joseph AB, Cornblatt RR. Antidepressant pharmacotherapy and the treatment of depression in patients with sever traumatic brain injury: a controlled, prospective study. *J Clin Psychiatry* 1996;57(12):582-587.
[68] Wroblewski B, McColgan K, Smith K, Whyte J, Singer WD. The incidence of seizures during tricyclic antidepressant drug treatment in a brain-injured population. *J Clin Psychopharmacol* 1990;10:124-128.
[69] Khouzam HR, Donnelly NJ. Remission of traumatic brain injury-induced compulsions during venlafaxine treatment. *Gen Hosp Psychiatry* 1998;20(1):62-63.
[70] Neurobehavioral Guidelines Working Group, Warden DL, Gordon B, McAllister TW, Silver JM, Barth JT, Bruns J, Drake A, Gentry T, Jagoda A, Katz DI, Kraus J, Labbate LA, Ryan LM, Sparling MB, Walters B, Whyte J, Zapata A, Zitnay G. Guidelines for the pharmacologic treatment of neurobehavioral sequelae of traumatic brain injury. *J Neurotrauma.* 2006;23(10):1468-501.
[71] Beck AT, Steer RA. *Beck scale for suicide ideation.* Manual New York: The Psychological corporation;1993.
[72] Berman AL, Shepherd G, Silverman MM. The LSARS-II: Lethality of Suicide Attempt Rating Scale-Updated. *Suicide Life Threat Behav*. 2003;33(3):261-276.

[73] von Cramon DY, Matthes-von Cramon G. Reflections on the treatment of brain-injured patients suffering from problem-solving disorders. *Neuropsychological Rehabilitation* 1992;2:207-229.

[74] Curran CA, Ponsford JL, Crowe S. Coping strategies and emotional outcome following traumatic brain injury: a comparison with orthopedic patients. *J Head Trauma Rehabil* 2000;15(6):1256-1274.

[75] Anson K, Ponsford J. Evaluation of a coping skills group following traumatic brain injury. *Brain Inj* 2006;20(2):167-178.

PART V: SUICIDE IN WAR VETERANS

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 16

SUICIDE IN VETERANS

David While and Navneet Kapur
University of Manchester, Manchester, United Kingdom

ABSTRACT

National suicide rates are used as an indicator of health and the reduction of suicide rates is therefore seen by many countries as a public health priority. Risk factors for general population suicides have been investigated internationally. This chapter provides an overview of the international literature on suicide in veterans and those who have left the Armed Forces. After an initial discussion of terminology, studies are discussed according to geographical location and theatre of conflict.

Findings from studies have been inconsistent. Although some studies have suggested increased suicide risk in selected groups, there is little firm evidence that the suicide risk of veterans overall is greater than that of the general population.

We end by discussing approaches to suicide prevention in this group and suggesting possible avenues for future research.

INTRODUCTION

The World Health Organisation (WHO) believes that the prevention of suicide has not been adequately addressed (1). WHO reported that in those aged 15-44 years old suicide is among the top three leading causes of death worldwide. Suicide rates among young people are increasing. Young people make up the highest risk group for suicide in a third of all developing and developed counties. The prevention of suicide is a health priority in the UK (2), US (3) and around the world (4).

The Centre for Disease Control and Prevention reported that in the US suicide is the 11th leading cause of death for all ages and is the leading cause of death among 25-34 year olds (5). Suicide accounted for approximately 32,000 deaths per year in the US in 2005. In the UK suicide accounts for approximately 5,000 deaths per year and is a major cause of premature mortality (6). The rate of suicide in males under 35 has doubled over the last two decades and it is now the commonest cause of death in this group (7).

In December 2008 the US Department of Defence had an active duty military strength, i.e. not including the National Guard or Reservists, of 1,402,227 personnel, an increase of 34,001 from December 2007 (8) (9). It also announced that military recruitment during the fiscal year of 2008 had achieved 184,841 new recruits (an increase of 3,669 from the previous fiscal year) (10) (11). Based on these figures approximately 150,000 military personnel are currently leaving the US Armed Forces per year. The executive director of Iran and Afghanistan Veterans of America has pointed out the adjustment back to civilian life may be difficult as individuals may be "literally in Baghdad in one week and in Brooklyn the next, and that transition is incredibly tough" (12).

The UK Regular Armed Forces personnel strength was about 193,100 during 2007 / 2008. During that period 21,330 were newly recruited and around 18,010 individuals left (13). The health of ex-service personnel continues to attract significant public and media interest in the UK (14). For a minority - the transition to civilian life is difficult (15) and may result in social exclusion, homelessness, alcohol misuse, unemployment, and poor mental health (16) (17). Although there have been anecdotal reports of increased suicide risk in specific groups of veterans (18) no studies have systematically examined suicide risk in individuals once they leave the UK military.

This chapter will provide an overview of the international literature on suicide in veterans and those who have left the Armed Forces.

TERMINOLOGY

When reviewing the scientific literature on suicide in discharged Armed Forces personnel a number of important distinctions emerge. The term *veteran* is used to describe two different groups. First, a *veteran* can be defined as someone no longer serving in the Armed Forces. This group includes all discharged personnel who had served in the Armed Forces. He / she could have served for as little as a few days / weeks or completed 20 years of Service. Second, a *veteran* can be defined as someone who has served in the Armed Forces in a specific theatre of conflict. For example, Gulf War *veterans* would be Armed Forces personnel who had served in the Gulf War and Vietnam *veterans* would have served in Vietnam. A Gulf War *veteran* who is still serving is therefore not a *veteran* using the first definition.

Some veterans could have volunteered for Service as in the UK and the USA. Others could have served as conscripts or completed National Service as currently practiced in some European countries such as Finland and Sweden (National Service ended in the UK in 1960 and in 1973 in the USA). Conscripts do not generally serve in specific conflicts but can sometimes volunteer as part of a United Nations presence in a peacekeeping role.

In the US, the Reservists and National Guard are generally considered as the homeland or part-time military that can be mobilised for national emergencies or war. However, a proportion of these forces have been deployed to overseas operations such as Iraq and Afghanistan (12).

Studies tend to be conflict specific and only a relatively small proportion of studies focus on those who have left the Armed Forces. However, studies of veterans of specific conflicts

are also considered here as they could be relevant. Some studies compare veterans from a specific conflict to a control group of veterans who did not serve in the same conflict.

The definition of suicide used in studies varies. Some studies use only deaths where a suicide verdict has been recorded by the coroner or medical examiner whilst others follow current UK convention by combining suicide (intentional self-harm) and undetermined intent (open) verdicts. In the UK the majority of open verdicts are thought to be suicide and excluding them may result in an almost 50% underestimate in the number of suicide deaths (19).

Firearms account for over 50% of US suicides (excluding undetermined deaths) and suicidal intent is therefore not difficult to determine (20). It has therefore been suggested that as veteran suicides are more likely to use firearms than non-veterans, intent is probably correctly classified. However, suicide by overdose accounts for a higher proportion of US non-veteran undetermined deaths than veterans. Hence, it is possible that a proportion of non-veterans deaths may be incorrectly classified (21).

Misclassification of US military suicides has also been investigated (22). During an 11 year period from 1990 to 2000 a proportionately larger number of pending / undetermined deaths were attributable to the Naval Service than other military branches. It was suggested that this was probably due to the difficulty in identifying intent when cause of death is by drowning from a fall from a ship. Hence, a proportion of undetermined Navy deaths were likely to be misclassified.

STUDIES OF DISCHARGED PERSONNEL

U.K.

The in-service rate of suicide is lower than that in the general population and this is likely to be a reflection of the "healthy worker effect" (23). Those serving in the Armed Forces have been selected for mental and physical health. The exception to the generally low rate of suicide is the group of young men (under 20 years old) in the Army who are at 50% greater risk than their civilian counterparts (23).

In 2002, veterans of the 3-month Falklands conflict (1982) claimed that more Falklands veterans had died by suicide (N = 264) since the conflict ended than died during the conflict itself (N = 256) (18). However, this has not been the subject of systematic study. An unsuccessful law suit against the UK Ministry of Defence was filed by 250 veterans claiming that (i) civilian health care professionals had little understanding about combat conditions, (ii) Falklands veterans were not adequately treated for Post Traumatic Stress Disorder and (iii) had inadequate psychiatric care after leaving the Services.

The shorter-term mental health needs of discharged personnel up to five years after leaving were examined in 2005 by Iversen et al (15). Those with mental health problems during Service were more likely to leave early and had a greater chance of being unemployed but the majority of the 8,195 sample of British discharged personnel were reported to have done well after leaving the Services. Suicide was not examined but those with mental health problems during Service were identified as a vulnerable group. An additional cross-sectional telephone survey of 496 vulnerable veterans from the sample (also carried out by Iverson et al

in the same year) confirmed this (17). Participation in the telephone survey was dependent on low General Health Questionnaire responses indicative of persistent psychological distress. Those with a formal psychiatric diagnosis were more likely to be lower rank, divorced or separated. There was no reported evidence of men being institutionalised (Military Retirement Syndrome). Although completed suicide was not investigated, depression (48%) and stress (28%) were the most common diagnoses after discharge. Just over half of those with self-reported mental health problems were seeking help, most often from their GP (87%).

UK initiatives have pointed to the need to raise awareness among primary care physicians of the importance of the military context. Voluntary sector organizations such as Combat Stress have also played a role in both raising awareness of possible poor outcomes and providing services for those who have left the Military (24).

Scandinavian Studies of Peacekeepers

A further group of studies have examined suicide in those who have served as peacekeepers. These individuals may not be typical of full-time regular personnel.

In 2003 Thoresen et al (25) carried out a cohort study of mortality from suicide on 22,275 Norwegian peacekeeping veterans who had served one or more tours of six months length between 1978 and 1995 using army registries and general population and cause of death databases. In comparison to Armed Forces from other Nations Norway does not have a professional Army except for the corps of commissioned officers. The peacekeepers were mainly recruited voluntarily from the general public who had finished their National Military Service and had adequate health and previous conduct. Standardised mortality ratios (SMRs) were calculated to compare suicides among the veterans with those among the general population of Norway through 1996. The SMR for suicide was the ratio between the observed and expected number of suicides. An SMR of more than 1.00 indicates that suicide is more likely in the veterans whilst a SMR of less than 1.00 suggests that suicide is more likely in the general population. An SMR of 1.00 suggests that death is equally likely in the two groups. The 95% confidence intervals (CIs) were calculated assuming a Poisson distribution for the observed number of suicides. If the confidence interval includes 1.00 then there is no significant difference between the two groups but if the CI does not include 1.00 then there is a significant difference in suicide rates between the two groups.

An increased SMR of 1.4 (95% CI = 1.1-1.8) was found for suicide. However, after adjusting for marital status this was reduced to non-significance (SMR = 1.1, 95% CI = 0.9-1.4). The authors concluded that the increased risk of suicide was related to the peacekeepers' lower marriage rate compared to the general population. Marital status categories comprised of married, divorced / separated or unmarried / widowed and although cohabiting is more common in Scandinavian countries than in Western Europe and North America the authors were unable to take it into account in their analysis. The authors also suggested that vulnerability factors could be present before entering Service but accepted that stress following peacekeeping duties could also influence vulnerability.

Complementing the cohort study with a psychological autopsy study published three years later, Thoresen et al (26) also carried out face-to-face interviews with next of kin of completed male suicides in the cohort (N = 73, 71 traced, with 45 responses, 2 excluded for

unreliable responses). Risk factors for suicide in veterans of peacekeeping were identified as: involuntary repatriation from peacekeeping duties, negative life events before peacekeeping, and not being married. Recommendations were made for the need for follow-up care for discharged personnel and the careful selection of peacekeepers.

In a Swedish study the suicide rate among 39,768 former peacekeeping personnel who had served in international U.N. or N.A.T.O. peacekeeping missions from 1st May 1960 to 31st December 1999 was compared with the general population rate for the equivalent age groups using the cause of death registry (through 2001) (27). A typical serving peacekeeper was in the age group 20-25 and could face varying levels of conflict especially as Sweden did not have a professional Army during this time period.

The exact start date of follow-up was not known and was therefore set at either age 20 years or the year 1960. The end of the follow-up was the date of death or the end of year 2001.

There were 182 suicides and 20 unclear causes of death in the former Swedish peacekeepers. The crude suicide rate was reported as 11.8 per 100,000 per year. The standardised mortality rate (SMR) for suicide was 0.7 (95% CI = 0.6-0.8) and 0.4 (95% CI = 0.3-0.6) for unclear causes of death.

The authors suggested that the lower than expected number of suicides seen in the former peacekeepers could have been due to the selection process. Compared to an equivalent group from the general population the peacekeepers were more likely to have had a favourable psychological status.

In a record linkage study using a different time period published in 2005, Gunnell et al (28) investigated the relationship between the results of intelligence tests at 18 years old and subsequent suicide (including deaths of undetermined intent). Data were provided by the Swedish military Service register (1968-1994), the census, the multi-generation register in Sweden and cause of death register data. Analysis was carried out on 987,308 Swedish men who were followed up for 5-26 years. The Swedish men were conscripted between ages 18 and 24 to complete their National Service and this represented 91% of conscripts for that time period. As follow-up began at date of conscription, analysis of data began at follow-up 5 years later, and the majority of Swedish men born between 1950 and 1976 were included in the sample, this study was unable to investigate suicide rates in those who had left the Armed Forces or meaningfully compare rates with the general population. The study did find that the risk of suicide was inversely related to intelligence test scores on conscription. In other words those with the lowest test scores were at the highest risk of suicide. The greatest risk was seen for poorly performing offspring of well educated parents. The parents' socio-economic status had a slight effect. The five years after conscription showed the strongest association.

U.S.A.

A recent population based study (2007) was carried out by Kaplan et al (29). They linked data from the US National Health Interviews survey (1986 to 1994) with cause of death data from the National Death Index (1986 to 1997). Suicide included intentional self-harm only.

The study included 320,890 men aged 18 years or older who were asked "*did you ever serve on active duty in the Armed Forces of the United States?"*. The answers to the question resulted in allocation of individuals to veterans or non-veterans groups. Overall there were

104,026 veterans and 216,864 non-veterans (those who had never served in the US Armed Forces). The self-reported method of determining veteran status is different to most other studies in this area and the study did not report if self-reported veteran status was verified.

To adjust for differential response to the US National Health Interviews survey, data were weighted and Cox proportional hazards regression analysis was carried out. The risk of suicide for veterans was twice (HR = 2.1, 95% CI = 1.1-4.0) that of non-veterans. A higher risk was also seen for those who were white, had 12 years or more of education and had limited activity levels. Neither age nor marital status was found to be a risk factor.

The findings of this study need to be interpreted cautiously for a number of reasons. Firstly, military Service was indicated by self-report. Secondly, the study sample was highly heterogeneous (ranging from those who had served in World War 1 to those who had served in the post-Vietnam era). The majority of the veterans (73%) saw Service in WWI, WWII, the Korean conflict or Vietnam. An additional 9.9% were from the post-Vietnam Service era and 16.8% were *other Service.* Hence, time since discharge from the Services varied considerably. In addition, as US National Service ended in 1973 the ex-service personnel in this study consisted of both regular and conscripted veterans. Thirdly, the general population comparison group was very different from the ex-service group (although the authors tried to adjust for this). For example, the majority (75%) of the veterans were 45 years of age or older (and 30% were 65 or older) yet the majority (70%) of the non-veterans were aged between 18 and 44. Seven per cent of the veterans had never married compared to 21% of the non-veterans. Fourthly, data on length of Service or time since discharge were not collected so the study was unable to explore the effect of these important variables.

STUDIES OF VETERANS OF SPECIFIC CONFLICTS

Gulf Wars: U.K.

A group of 53,462 Gulf War veterans were compared to a matched serving control group not deployed to the Gulf by Macfarlane et al (30). Details of both cohorts were sent to the Office of National Statistics (ONS) for linking with the National Health Service Central Register. If individuals were identified as having died, ONS provided a cause of death. Mortality rate ratios (MRR) were calculated (the rate of deaths in the exposed group - the Gulf War veterans - divided by the rate of deaths in the group not exposed). A MRR of more than 1.0 indicates that death is more likely in the first group whilst a MRR of less than 1.0 suggests that death is more likely in the second group. An MRR of 1.0 suggests that death is equally likely in the two groups. If the confidence interval (CI) includes 1.00 then there is no significant difference between the two groups but if the CI does not include 1.0 then there is a significant difference in mortality rates between the two groups.

No increase in the overall veteran mortality rate ratio (MRR = 1.1, 95% CI = 0.9-1.2) was reported. Death from suicide (self-harm only) was similar in the Gulf and non-Gulf cohorts (MRR = 1.0, 95% CI = 0.7-1.5). It was not reported how many had left the Services. The follow-up study (31) on the same cohort 13 years after the conflict confirmed the original findings with an MRR for self harm of 1.0 (95% CI = 0.8-0 1.4). Deaths from external causes

(mostly motor vehicle accidents) were more common in the Gulf-cohort, especially in the first 6 years or so of follow up (MRR (95% CI) 1991-1997: 1.3 (1.1-1.6))

Gulf Wars: U.S.A.

In 2002 Kang et al (32) examined the mortality of USA and UK veterans of the Gulf War (1990-1991) by reviewing four influential studies (for three Kang was lead author). Cause-specific mortality was compared in Gulf War veterans and non-Gulf War veterans. The reported results were consistent with no excess of reported suicides (self-harm). One of the studies (33) was a 7-year follow-up of US veterans of the 1991 Gulf-War, comparing 621,902 Gulf War veterans with 746,248 non-Gulf War veterans. It repeated an earlier analysis on the same cohort which had a shorter follow-up time (34). The rate of suicide was similar in veterans who had and had not served in the Gulf (rate ratio (95% CI) for males: 0.9 (0.8-1.0)). Comparisons of overall mortality were also made to the USA general population and SMRs were adjusted for age, race, sex and calendar year of death. Overall mortality was lower in both the Gulf War veteran group (N = 621,902, SMR = 0.4, 95% CI = 0.4-0.4) and in the veterans who had not served in the Gulf-War (N = 746,248, SMR=0.4, 95% CI = 0.4-0.4) than in the general population. Neither group had a reported excess in cause-specific mortality but SMRs for suicide were not presented.

More recently Kang et al (35) calculated the suicide risk for USA veterans of Operation Iraqi Freedom (commenced March 2003) and the Afghanistan arena of Operation Enduring Freedom (commenced October 2001). The veterans were identified via the Defence Manpower Data Center and had separated from active duty between October 2001 and December 2005. US active duty is usually defined as "Full-time duty in the active military service of the United States" (36). Study follow-up ended at 31st December 2005 or date-of-death (using the most recent cause-of-death obtained from the National Death Index). Electronic Veterans Agency (VA) medical records were used to identify VA patients with a medical disorder of interest (based on ICD definitions). These were: affective psychoses (including major depressive disorder); neurotic disorders, alcohol / drug dependence; acute reaction to stress; adjustment disorder (including post traumatic stress disorder) and depressive disorders not classified elsewhere.

There were 818 deaths in the 490,346 veteran population, 144 of which were suicides (ICD codes E950-E959). Forty seven per cent of the veteran population were from the National Guard or Reservists. Standardised mortality ratios were calculated (standardising for age, sex, race and calendar year of death) using deaths / suicides in the US general population as the comparison population. For the veterans the overall risk of death from all causes was significantly lower (SMR = 0.56, 95% CI = 0.52-0.60) and the SMR for suicide was no different from the US general population (SMR = 1.15, 95% CI = 0.97-1.35). However, after stratification the suicide risk was elevated for VA patients with a mental disorder (SMR = 1.77, 95% CI = 1.01-2.87) and active duty veterans (those who were from the regular military Services that is, not the National Guard or Reservists) (SMR = 1.33, 95% CI = 1.03-1.69).

Although the relationship between those with mental disorder and other factors such as type of deployment during Service was not explored, Kang et al plan to extend the study and also explore delayed risk.

Gulf Wars: International

In 2006 all International research covering UK, USA, Australia, Canada and Saudi Gulf War veterans up to August 2005 was reviewed by Gray and Kang (37). The authors used: PubMed searches; expert panel reports; Current Contents; reports to the US Congress; a topical Gulf War veteran bibliography with 5,520 references; conference proceedings and personal contacts with knowledgeable investigators to identify published research and ongoing research. They concluded that there was no evidence of an excess of suicide and no evidence of a specific Gulf War illness. However, Gulf War veterans were at increased risk of injuries especially motor vehicle accidents. Some studies suggested that mental disorders such as depression or risk taking behaviour could contribute to this increase. Based on the literature Gray and Kang hypothesised that future veterans would be at increased risk for mental health disorders, multi-symptom conditions, accident related injuries and musculoskeletal disorders. They also recommended that research be redirected into preventing illness among current and future military personnel rather than on Gulf War veteran morbidity.

Vietnam: U.S.A.

The last American troops officially left Vietnam in 1975. The long-term health effects of Army military Service in Vietnam were examined by the Centre for Disease Control and Prevention in the 1980s as the Vietnam Experience Study (38). Using Cox proportional hazards regression in 2004 a 30 year follow-up by Catlin Boehmer et al (39) compared the mortality in Vietnam Army veterans to non-Vietnam Army veterans (those who served in Korea, Germany or the United States). Data for higher level enlisted ranks and officers were not collected. Suicide deaths were analysed separately to deaths from undetermined intent.

From 4.9 million Vietnam era-Army personnel records, a random sample of 48,513 was selected and 18,581 met the eligibility criteria (which were chosen to increase comparability between Vietnam and non-Vietnam veterans). Inclusion criteria were: (i) entering Service between 1965 and 1971, (ii) completing one term of enlistment, (iii) completing ≥ 16 weeks of active Service time, (iv) having a military occupational speciality rather than being a trainee and (v) not being promoted from the ranks at time of discharge. In total, 9,324 had Vietnam experience and were eligible for inclusion in the Vietnam veterans group whilst 8,989 had no Vietnam experience and were eligible for inclusion in the non-Vietnam veterans group.

All-cause mortality was 7% higher in Vietnam veterans (although this was not statistically significant). External causes of mortality, especially motor vehicle accidents were higher in the Vietnam veterans (rate ratio for external causes of death (95% CI): 1.2 (1.0-1.4)). The excess mortality was most marked in the first five years after discharge from active duty. Within the first five years there were 16 Vietnam veteran suicides and 9 non-Vietnam veteran suicides. On the basis of rates for non-Vietnam suicides the crude rate ratio for suicide in the first five years after discharge was 1.72 but the 95% confidence intervals indicated that this was not statistically significant (95% CI = 0.8-4.0). After five years the rate ratio was 0.9 (95% CI = 0.6-1.3).

Another study carried out in 1996 used databases held by the Department of Veterans Affairs and Social Security Administration databases to determine the vital status of nearly 35,000 veterans who were wounded in Vietnam (identified using the Casualty Information System Tape) (40). Although the overall risk of suicide was not significantly increased, the authors did find an association between wounding and subsequent suicide risk. The general population was used as the comparison group and the SMR (95% CI) was 1.8 (1.1-3.0) for those who were wounded more than once and hospitalised.

PREVENTING SUICIDE IN VETERANS

In June 2008 the USA Blue-Ribbon Veterans Agency Suicide Prevention Panel published their final report (21). Although the panel praised the USA Department of Veterans Affairs for its suicide prevention strategy it also made several recommendations to further enhance the Veterans Health Administration programs. The first recommendation was to collaborate with other federal agencies to set up plans "to resolve conflicting study results in order to ensure a consistent approach to describing the rates of suicide and suicide attempts in veterans". A Congressional report released the previous month had summarised work on suicide prevention among US veterans and listed risk factors that were thought to increase their chance of suicide attempts (41). The report included figures obtained from the CDC and the National Violent Death Reporting System (NVDRS). Risk factors identified included: combat exposure; post-traumatic-stress-disorder (and other mental health problems); traumatic brain injury; poor social support structures and access to lethal means.

In many developed countries National suicide prevention plans are already implemented and are underway. A recent systematic review suggested that training primary care physicians in depression recognition and treatment might be one of the most effective strategies to prevent suicide in the general population (4). There are no reasons to believe that this does not apply to ex-service personnel. Primary care is likely to have an important role in preventing suicide in those who have left the Armed Forces.

Some authors have highlighted the potential problems in going from what might be perceived as a highly ordered institutional environment to a relatively unstructured civilian life (42) and there is some evidence that pre-service vulnerability is associated with negative health outcomes. For example one study found that negative life events before peacekeeping duty were associated with subsequent suicide risk (26). Another study reported that pre-enlistment childhood factors such as difficult family relationships or problem behaviours in childhood were associated with worse physical and mental health outcomes (43).

In the UK this could reflect difficulties in the accessibility or acceptability of NHS mental health services to those who have left the Armed Forces or the difficulties the NHS may have in assessing the treatment needs of veterans (15).

Initial pre-recruitment interview, medical examination, high induction standards, and training are obviously important in ensuring a healthy military (44), but it should be recognised that those who are selected out of Service at any of these stages may be at potentially high risk of adverse outcomes including suicide.

What other forms might interventions take? The mainstay of any strategy is likely to be a combination of practical and psychological preparation for discharge (42) (45) (46) and

encouraging appropriate help seeking behaviour once individuals have left the Armed Forces (15). In the UK all those who receive medical discharges are currently entitled to a full resettlement package and there are also initiatives designed to help early Service leavers access appropriate health services after they have left (46). Recently the UK Department of Health wrote to all Primary Care, Acute and Mental Health Trusts emphasising that veterans should receive priority access to secondary care for any conditions which were likely to be Service-related (47). In addition, a community-based mental health service for veterans led by the NHS and characterised by regional clinical networks involving partnerships of relevant experts is currently being piloted (48).

Another issue is whether services should be provided in military or civilian settings. Services need to be in place that are culturally sensitive to the particular needs of veterans. Some authors have pointed out that other countries (for example the USA and Australia) have dedicated health care systems for veterans (49). However in the UK, the centrally funded health system, the focus on social inclusion, and the comparatively small numbers of veterans, have meant that the emphasis is on providing treatment within the National Health Service. Some individuals may want very little to do with the Armed Forces once they have left and this provides a further rationale for provision of interventions within civilian health systems.

CONCLUSION

A number of studies have examined mortality outcomes in relation to specific conflicts. Studies of UK and US veterans of the 1990-1991 Gulf War have found no overall differences in suicide mortality between those deployed to the Gulf and matched cohorts of individuals who were serving in the Armed Forces but were not deployed to the Gulf. In the US the mortality rate for all causes-of-death among OIF / OEF veterans was significantly lower than the mortality rate in the general US population. Additionally, the standardised mortality rate for suicide was no different when compared to the general US population (35). However, the suicide risk was significantly elevated for VA patients with a mental disorder and for those who were from the regular military, i.e. not from the National Guard or Reservists.

Another US study examined outcomes over 12 years in a cohort of individuals who indicated on a population survey that they had served in the military at any time (29). The sample was heterogeneous (ranging from veterans of World War 1 to veterans of the post-Vietnam era) and the general population comparison group was much younger than the veterans' cohort. The study reported that veterans were twice as likely to die by suicide than non-veterans, and this remained significant after adjustment for a number of demographic and health-related factors.

A further group of studies have examined suicide in those who have served as peacekeepers. These individuals may not be typical of full-time regular personnel. In addition, findings have been inconsistent.

In general, there has been very little research investigating suicide in those who have left the Armed Forces and studies have tended to focus on those who have served in specific conflicts (a proportion of whom remain in Service). Because suicide is a comparatively rare outcome, most studies have included few such deaths and have not examined suicide risk in

relation to age. Equally, there has been no exploration of timing and little consideration of the risk factors for suicide in relation to leaving the military. Although previous work has suggested that some ex-service personal may be reluctant to seek help for mental health problems (17), no studies have examined rates of contact with mental health services prior to suicide. Future studies might attempt to address some of these limitations but also examine a wider range of mortality outcomes in those who have left the Armed Forces – there is some evidence that veterans may be at greater risk of other causes of unnatural mortality such as accidents (30) (34). Equally, it would be worthwhile examining other outcomes related to suicidal behaviour such as self-harm and attempted suicide (43). Alternative methodologies such as qualitative research or psychological autopsy studies may shed light on the processes which lead to suicide risk following discharge and so inform interventions. The psychological autopsy approach involves analysis of information from a variety of sources on a relatively small number of suicides. Sources might include general medical records, doctor's notes, Coroner's notes and semi-structured interviews with a close relative(s) / friend(s). This approach identified involuntary repatriation from peacekeeping duties, negative life events before peacekeeping, and not being married as risk factors in a previous study (26).

It might also be possible to examine suicide risk in relation to serving in specific conflicts but this would depend on the availability of reliable data on deployment. Reservists may be at greater risk of adverse mental health outcomes than regulars (50) and a comparative study of suicide risk may be worthwhile.

In October 2006 the US Government Accountability Office submitted a report to Congress that said guidance was needed to accurately and consistently measure the contributions of reserve components in the Iraq and Afghanistan campaigns (51).

REFERENCES

[1] World Health Organisation, Programmes and Projects, Mental Health Home, Suicide Prevention and Special Programmes, Suicide Prevention (SUPRE).Available: *www.who.int/mental_health/prevention/suicide/suicideprevent/en/*

[2] Department of Health. National Suicide Prevention Strategy for England 2002. London, Stationary Office. 2002.

[3] US Department of Health and Human Services, Office of the Surgeon General, The Surgeon General's Call to Action to Prevent Suicide 1999. Available: *ww.surgeongeneral.gov/library/calltoaction/calltoaction.htm*

[4] Mann JJ, Apter A, Bertolote J, Beautrais A, Currier D, Haas A, Hegerl U, Lonnqvist J, Malone K, Marusic A, Mehlum L, Patton G, Phillips M, Rutz W, Rihmer Z, Schmidtke A, Shaffer D, Silverman M, Takahashi Y, Varnik A, Wasserman D, Yip P, Hendin H: Suicide prevention strategies. A systematic review. *JAMA* 2005; 294 (16): 2064-2074.

[5] Centres for Disease Control and Prevention, Suicide: Facts at a glance.Available: *www.cdc.gov/ncipc/dvp/Suicide/suicide_data_sheet.pdf*

[6] Gunnell D, Middleton N: National suicide rates as an indicator of the effect of suicide on premature mortality. *Lancet* 2003; 362 (9388): 961-962.

[7] Kapur, N: Suicide: causes and prevention. *Br J Hosp Med* 2004; 65 (11): 644-645.

[8] US Department of Defence Personnel and Procurement Statistics. Personnel and Procurement Reports and Data Files. Military Personnel, Active duty Military Personnel by Rank/Grade December 31, 2008.Available: *siadapp.dmdc.osd.mil/personnel/MILITARY/rg0812.pdf*

[9] US Department of Defence Personnel and Procurement Statistics. Personnel and Procurement Reports and Data Files. Military Personnel, Active duty Military Personnel by Rank/Grade December 31, 2007.Available: *siadapp.dmdc.osd.mil/personnel/MILITARY/rg0712.pdf*

[10] US Department of Defence, News release, DoD Announces Recruiting and Retention Numbers for Fiscal 2008, No. 861-08, October 10, 2008.Available: *www.defenselink.mil/releases/release.aspx?releaseid=12277*

[11] US Department of Defence, News release, DoD Announces Recruiting and Retention Numbers for FY 2007, No. 1202-07, October 10, 2007.Available: *www.defenselink.mil/releases/release.aspx?releaseid=11398*

[12] Army Times, News. Data: more reservist suicides than other vets.Available: *www.armytimes.com/news/2008/02/ap_reservesuicide_080212/*

[13] UK Defence Statistics, 2008. Available: *www.dasa.mod.uk/modintranet/UKDS2008/ukds.html?PublishTime=09: 30: 00*

[14] Observer (3rd February) 2008. Available: *www.guardian.co.uk/afghanistan/story/0,,2251685,00.html*

[15] Iversen A, Nikolaou V, Greenberg N, Unwin C, Hull L, Hotopf M, Dandeker C, Ross J, Wessely S: What happens to British veterans when they leave the armed forces? *European Journal of Public Health* 2005; 15 (2): 175-184.

[16] Ballintyne S, Hanks S. Lest we should forget: Ex-servicemen and homelessness. *Crisis*. London. 2000.

[17] Iversen A, Dyson C, Smith N, Greenberg N, Walwyn R, Unwin C, Hull L, Hotopf M, Dandeker C, Ross J, Wessely S: 'Goodbye and good luck': the mental health needs and treatment experiences of British discharged personnel. *Br J Psychiatry* 2005; 186; 480-486.

[18] Spooner MH: Suicide claiming more British Falkland veterans than fighting did. *CMAJ* 2002; 166 (111): 1453

[19] Linsely KR, Schapira K, Kelly TP: Open verdict v. suicide – importance to research. *Br J Psychiatry* 2001; 178: 465-468.

[20] American Foundation for Suicide Protection, Facts and Figures, National Statistics.Available:*www.afsp.org/index.cfm?fuseaction=home.viewpage&page_id=050FEA9F-B064-4092-B1135C3A70DE1FDA*

[21] Report of the Blue Ribbon Work Group on Suicide Prevention in the Veteran Population.Available: *www.mentalhealth.va.gov/suicide_prevention/Blue_Ribbon_Report-FINAL_June-30-08.pdf*

[22] Eaton KM, Messer MS, Garvey Wilson AL, Hodge CW: Strengthening the validity of population-based suicide rate comparisons: an illustration using US military and civilian data. *Suicide Life Threat Behav* 2006; 36(2): 182-191.

[23] *Suicide and open verdict deaths in the UK regular armed forces* 1984-2006. Defence Analytical Services Agency. Endsleigh. 2007.

[24] Combat Stress.Available: *www.combatstress.org.uk*

[25] Thoresen S, Mehlum L, Moller M: Suicides in peacekeepers: A cohort study of mortality from suicide in 22,275 Norwegian veterans from International peacekeeping operations. *Society of Psychiatry Epidemiology* 2003; 38: 605-610.

[26] Thoresen S, Mehlum L, Roysamb E, Tonnessen A: Risk factors for completed suicide in veterans of peacekeeping: repatriation, negative life events and marital status. *Archives of Suicide Research*. 2006 10; 353-363.

[27] Michel P-O, Lundin T, Larsson G: Suicide rate among former Swedish peacekeeping personnel. *Mil Med* 2007; 172 (3): 278-285.

[28] Gunnell D, Magnusson PKE, Rasmussen F: Low intelligence test scores in 18 year old men and risk of suicide: cohort study. *BMJ* 2005; 330 (7484): 167-172.

[29] Kaplan MS, Huguent H, McFarland BH, Newsom JT: Suicide among male veterans: a prospective population-based study. *J Epidemiol Community Health* 2007; 61: 619-624.

[30] Macfarlane GJ, Thomas E, Cherry N: Mortality among UK Gulf War veterans. *Lancet* 2000; 356 (9223): 17-21.

[31] Macfarlane GJ, Hotopf M, Maconochie N, Blatchley N, Richards A, Lunt M: Long-term mortality amongst Gulf War veterans: is there a relationship with experiences during deployment and subsequent morbidity? *Int J Epidemiol* 2005; 34: 1403-1408.

[32] Kang HK, Bullman MS, Macfarlane G, Gray GC: Mortality among US and UK veterans of the Persian war: a review. *Occup Environ Med* 2002; 59: 794-799.

[33] Kang HK, Bullman MS: Mortality among US veterans of the Persian Gulf War: 7-year follow-up. *Am J Epidemiol* 2001; 154 (5): 399-405.

[34] Kang HK, Bullman MS: Mortality among U.S. veterans of the Persian Gulf War. *N Engl J Med* 1996; 335: 1498-1504.

[35] Kang H, Bullman T: Risk of suicide among US veterans after returning from the Iraq or Afghanistan war zones. *JAMA* 2008; 300 (6): 652-653.

[36] Statistical Information Analysis Division, Military Personnel, Glossary of Department of Defence Work Force Terms.Available: *siadapp.dmdc.osd.mil/ personnel/ NETGLOSS.HTM*

[37] Gray GC, Kang HK: Healthcare utilization and mortality among veterans of the Gulf War. *Philosophical Transactions of the Royal Society of London.* Series B 2006; 361: 553-569.

[38] Centre for Disease Control and Prevention, U.S. Department of Health and Human Sciences.Available: *www.cdc.gov/nceh/veterans/default1.htm*

[39] Catlin Boehmer TK, Dana Flanders W, McGeehin MA, Boyle C, Barrett DH: Post service mortality in Vietnam veterans. *Arch Intern Med* 2004; 164: 17.

[40] Bullman TA, Kang HK: The risk of suicide among wounded Vietnam veterans. *Am J Public Health* 1996; 86 (5); 662-667.

[41] Sundararaman R, Panangala SV, Lister SA. Congressional Research Service Report for Congress, Suicide Prevention Among Veterans, May 5, 2008. Order Code RL34471.Available: *fas.org/sgp/crs/misc/RL34471.pdf*

[42] Jolly R. *Changing Step: from Military to Civilian Life.* London. Brasseys (UK) Ltd. 1996.

[43] Iversen AC, Fear NT, Simonoff E, Hull L, Horn O, Greenberg N, Hotopf M, Rona R, Wessely S: Influence of childhood adversity on health among male UK military personnel. *Br J Psychiatry* 2007; 191: 506-511.

[44] Hyams KC. Mental health screening before troop deployment: *BMJ* 2006; 333: 979-980.

[45] Ministry of Defence, ARMY. Career structure & benefits; Resettlement.Available: *www.army.mod.uk/join/terms/1107.aspx*

[46] Career Transition Partnership, the Ministry of Defence working with Right Management.Available: *www.ctp.org.uk/ctp/serviceleavers/non-ctp-resettlement-support/*

[47] Nicholson D. Access to health services for military veterans. Letter to: Chief Executives of Primary Care Trusts; Chief Executives of NHS acute and mental health trusts; Chief Executives of NHS Foundation Trusts. Department of Health. 12 December 2007.Available: *www.icn.csip.org.uk/_library/Military_veterans_DCL.pdf*

[48] Service Personnel and Veterans Agency.Available: *www.veterans-uk.info/mental_health/faq.html*

[49] Iversen A, Wessely S: *The needs of UK veterans with psychological problems: a systematic review of the literature*. King's Centre for Military Health Research. London. 2005.

[50] Browne T, Hull L, Horn O, Jones M, Murphy D, Fear NT, Greenburg N, French C, Rona RJ, Wessely S, Hotopf M: Explanations of the increase in mental health problems in UK reserve forces who have served in Iraq. *Br J Psychiatry* 2007; 190: 484-489.

[51] United States Government Accountability Office. Report to Congressional Committees. MILITARY PERSONNEL: Reserve Components Need Guidance to Accurately and Consistently Account for Volunteers on Active Duty for Operational Support.Available: *www.gao.gov/new.items/d0793.pdf*

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 17

SUICIDAL BEHAVIOR IN WAR VETERANS

Sandeep Grover
Postgraduate Institute of Medical Education and Research, Chandigarh, India

ABSTRACT

Suicide in war veterans has being a focus of researchers, administration and media since the time of Vietnam War. Over the years there has been some research in this area. However till now there is no consensus as to whether suicide rates are higher in war veterans compared to general population. However, studies have shown that veterans have many known risk factors for suicide as found in general population. In addition there is evidence to suggest that some of the risk factors like experience of combat, presence of combat guilt, severe physical trauma and higher prevalence of mental illnesses like depression and PTSD make this population more vulnerable to suicide. There is urgent need to develop suicide prevention programmes specifically for veterans.

INTRODUCTION

Persons, who participate in the war, usually have to travel away from their home, at time have to stay away from their home for long duration, participate in combat activities and/or witness the same, witness the death of their friends and near and dear ones. Once they come back from the war, the treatment given to them by the society depends on the outcome of the war. If they come victorious they are treated with great respect and honor for their contribution, but at times they are not treated with respect. Further, because of long stay in the battle field, they become addicted to alcohol and other substances; have difficulty in adjusting to their family and society. All this together contributes to frequent prevalence of emotional turmoil, depression, post traumatic stress disorder, guilt etc in this population and makes them vulnerable to suicide. In this article the epidemiology, model for suicide and risk factors found to be associated with suicide in war veterans will be discussed. Preventive strategies are discussed in brief.

EPIDEMIOLOGY OF SUICIDE IN WAR VETERANS

The suicide rates in war veterans have always being a focus of researchers, administration and media. Many studies have evaluated the suicide rates in war veterans and have compared the suicide rates with era veterans, non veterans and general population (1). Most of these studies have included only male veterans; however some of the studies have also included female veterans (2). Further, most of the studies have focused only on the veterans attending health care services and some have focused on the veterans in general population (1). These studies have either calculated the proportionate mortality rates or mortality rates and are mostly based on the cause of death as recorded in the death certificates. Further, some of the studies have focused only the subjects with mental illness and have compared the rates with general population. However there is no consensus as to whether suicide rates are more, less or same in war veterans in comparison to general population.

Studies done in late eighties and later, as shown in table-1 showed that the risk of suicide in Vietnam War veterans was at most 1 to 1.5 time that of other men of similar age during the postservice period. Similarly studies done on gulf war veterans have also shown more or less similar level of risk. However, these studies have been criticized on many fronts. First, some of the authors (1) pointed out that about three-quarters of veterans do not receive healthcare through VA facilities, hence these studies may not be a true reflection of the suicide rates (1). Kaplan et al (1) used 1986–94 National Health Interview Survey (NHIS) data to assess the relative risk of suicide for male veterans in the general population. They found that over time veterans were twice as likely (adjusted HR 2.13, 95% CI 1.14 to 3.99) to die of suicide compared with male nonveterans in the general population. However, the risk of death from natural (diseases) and the risk of death from external (accidents and homicides) causes did not differ between the veterans and the non-veterans after adjusting for the confounding factors. Further they found that veterans who committed suicide were significantly more likely than were non-veteran to be older, white, and high-school graduates, and less likely to never be married at baseline. Furthermore, veterans were more likely to have committed suicide using a firearm than their non-veteran counterparts. Second, most of these studies are based on cause of death as recorded in the death certificates, which again may not be a true representation because many of the deaths may not be classified as suicide death because of various reasons. For example in a study, Pollock et al (3) reviewed the causes of deaths in two population based cohorts collected for Centers for Disease Control (CDC) Vietnam Experience Study and Wisconsin Division of Health study. The cause of death certificate was evaluated on the basis of information available from all additional medical and legal records pertaining to the cause of death. A medical review panel, which didn't have any knowledge of the cause-of-death statements on the death certificate or the decedent's place of service, assessed the cause of death on the basis of the supplementary information. The medical panel opined that in the study population there were actually 32 suicide deaths rather than 29 as reported in the CDC cohort data. Third, some of the authors have pointed out that many of the accidental deaths occuring in the veterans may be actually suicidal death. Studies have consistently shown that there is increased risk of accidental death in military population exposed to war and trauma. Further it is also reported that the excess mortality due to accidents immediately after returning from war reduces at 5-6 years of follow-up (4,5). It is suggested that these excess of accidental deaths may be due to risk-taking behaviour, use of

alcohol and mental health problems (6-8), which are common risk factors for suicide and accidents.

Table 1. Epidemiology of suicide in veterans

Authors	Population studied	Comparison Group	Country to which veterans belonged	Risk analysis	Ratios for veterans who participated in war (95% confidence intervals)
Lawrence et al (12)	Vietnam veterans	Era veterans	USA	Proportionate mortality	1.24 (0.88-1.75)
Kogan & Clapp (13)	Vietnam veterans	Era veterans	USA	Proportionate mortality	1.24 (0.98-1.56)
Anderson et al (14)	Vietnam veterans	Era veterans	USA	Proportionate mortality	0.98 (0.84-1.15)
Centers for Disease Control (15)	Vietnam veterans	Era veterans	USA	Proportionate mortality	0.98 (0.58-1.65)
Breslin et al (16)	Vietnam veterans	Era veterans	USA	Mortality rate	0.93 (0.86-1.01)
Kogan & Clapp (13)	Vietnam veterans	Nonveterans	USA	Proportionate mortality	1.46 (1.02-2.08)
Holmes (17)	Vietnam veterans	Nonveterans	USA	Proportionate mortality	1.11 (0.85-1.44)
Anderson et al (14)	Vietnam veterans	Nonveterans	USA	Proportionate mortality	1.22 (1.04-1.43)
Anderson et al (14)	Vietnam veterans	General male population	USA	Mortality rate	1.07 (0.90-1.25)
Centers for Disease Control (15)	Vietnam veterans	General male population	USA	Mortality rate	0.99 (0.66-1.42)
Hearst et al (18)	Vietnam veterans	General population	USA	Proportionate mortality	1.65 (1.26-2.15)
Crane et al (19)	Vietnam veterans		Australia	Standardized mortality rates	1.21 (1.02-1.42)
Wilson et al (20)	Vietnam veterans	Nonveterans	Australia	Standardized mortality rates	1.43 (1.10-1.85)
Harrex et al (21)	Korean war veterans	Australia male population	Australia	Standardized mortality rates	1.31 (1.14-1.39)
Macfarlane et al (22)	Gulf war veterans	Era veterans	UK	Mortality rate	0.98 (0.65-1.48)
Kang and Bullman (23)	Gulf war veterans	Era veterans	USA	Standardized mortality rates	0.94 (0.79-1.12)
Kang and Bullman (5)	Male Gulf war veterans	Male Era veterans	USA	mortality rates	0.92 (0.83-1.02)
Kang and Bullman (5)	Female Gulf war veterans	Female Era veterans	USA	mortality rates	1.29 (0.78-2.31)
Writer et al (24)	Gulf war veterans	Era veterans	USA	Standardized mortality rates	
Bullman et al (25)	Army Gulf war veterans exposed to Khamisiyah Chemical Munitions Destruction	Non-exposed	USA	Proportionate mortality	1.05 (0.88-1.25)
Kaplan et al (1)	Gulf war veterans	General population	USA	Hazard ratio	2.13 (1.14-3.99)
Kang and Bullman (10)	Veterans of OIF/OEF#	General population	USA	Standardized mortality rates	1.15 (0.97-1.35)
Michel et al (2)	Peace keepers	General population	Sweden	Standardized mortality rates	0.67 (0.58 - 0.77)

Veterans of Operations Iraqi Freedom and Enduring Freedom

Fourth, the data has been criticized based on the interpretation. Studies have shown that in general suicide rates among military personnel are usually lower than the general population (9), hence if the suicide rates in war veterans appear to be similar to general population; this actually represents an increase in risk (10). Fifth, some of the authors have argued that the excess mortality due to suicide and other unnatural causes found in some of the studies is actually due to mental illness, rather than anything else (11). They considered that veterans with mental illness experienced the mortality gap similar to that of members of the general population requiring these mental health services. They compared the causes of death among veterans receiving mental health care and general medical care and found that mental health patients were more likely to die of infectious diseases, accidental drug overdose, other accidents, and confirmed or suspected suicides. Further they also found that veterans receiving mental heath care died about 6 years earlier than those receiving general medical care.

From the above it can be concluded that although the mortality rates have been reported to be only 50% more than the comparison groups, in true sense this reflects increase in suicide rates in veterans compared to general population.

RISK FACTORS FOR SUICIDE IN WAR VETERANS

Before trying to understand the risk factors associated with suicide and suicidal behaviour in war veterans, it is important to understand what a risk factor is and what the understanding of risk factors for suicidal behaviour is in general and risk factors identified in armed forces because the war veterans form a subgroup of these populations.

A risk factor is defined as a characteristic or variable that increases the likelihood of development of an adverse outcome (26), which can be measured and which precedes the outcome (27). From an epidemiologic point of view risk factors for suicide can be divided into distal and proximal factors. Distal risk factors are those characteristics which increase an individual's risk for later suicidal behaviour in the presence of proximal risk factors. They are considered as necessary, but not sufficient, for suicide to occur and their relationship to suicide is indirect. The proximal risk factors are temporally more closely related to the suicidal event and can act as precipitants. However, it is important to understand that proximal risk factors are neither necessary nor sufficient for suicide. The combination of powerful distal and proximal factors, can lead to the necessary and sufficient situation for a person to commit suicide (28). Further, it has been found that many individuals may have one or more risk factors but may not be suicidal; and on the other hand, the likelihood of suicide or suicidal behavior increases with an increasing number of risk factors (28). With regard to the distal risk factors, which have been identified to be linked to suicide in general, it has been seen that in most of the industrialized countries the rate of suicide increases with increasing age, with the highest suicide rates among elderly. Other factors consistently linked to suicide include male gender, divorced and widowed status, presence of mental or addictive disorder, presence of more than one psychiatric disorder, presence of comorbid mental, addictive, and physical disorders, presence of prior suicidal attempt, presence of family history of suicidal behaviors, mood disorder or substance abuse disorder, disrupted family environment negative parenting and physical or sexual abuse. In terms of proximal risk

factors, it has been seen that suicidal behaviour is more common in the presence of recent, severe, stressful life events, presence of a firearm in the home and presence of physical illnesses like HIV/AIDS, Huntington's disease, malignant neoplasms, multiple sclerosis, peptic ulcer, renal disease, spinal cord injuries, and systemic lupus erythematosus (28).

It has been found that in general the prevalence of mental illness is less in the armed force personnel with the exception of alcohol abuse. Alcohol abuse is the most prevalent mental disorder in the armed force personnel and it is slightly more prevalent than seen other nonmilitary populations (29). Further it has been shown that woman, young personnel, less educated, single, white, short-term service, enlisted and those who are in the army are at greater odds for some mental disorders (29). However, studies have shown higher prevalence of mental disorders in armed force personnel who commit suicide (30). The studies done on armed force personnel have also shown that Caucasian (31), male (31,32), those with a history of deliberate self-harm, and a recent medical downgrading are risk factors for suicide (32).

Studies done in the war veterans have shown many of the common risk factors as found in general population like being male (33), presence of mental illness (10, 34, 35), addictive disorders, comorbid psychiatric disorders (34,35), current adjustment difficulties (36), access to firm arms (37,38), diminished social environment support exemplified by homelessness and unmarried status (38) etc to be associated with suicide. However, the rate of mental disorders have been reported to be much higher that general population. Veterans Health Study, showed prevalence of significant depressive symptoms among veterans was 31%, which is 2- to 5-times higher than among the general US population (39). Studies of veterans conducted years after their service ended have shown current posttraumatic stress disorder (PTSD) prevalent in 15-20 percent of Vietnam veterans (39, 40) which is much higher than rate of PTSD among the general adult population in the United States 3 to 4 percent (41). Further the studies done on Vietnam veterans have shown life time PTSD prevalence of 30.9% among male veterans who served in the Vietnam during 1964–1975 (42). Similarly Hoge et al (43) studied the American military personnel who returned from combat operations in Iraq and Afghanistan and found higher rates of PTSD, generalized anxiety, major depression, and misuse of alcohol. Further, they found an association between rates of PTSD and the extent of combat exposure like being shot at, handling dead bodies, knowing someone who was killed, or killing enemy combatants. Studies done from other parts of the world have also shown higher prevalence of mental disorders in veterans. Study done by Department of Veterans' Affairs in Australia has showed that more than 30% of Vietnam veterans reported mental disorders (44). Further there is research evidence to suggest that there is extensive comorbidity of these high-risk diagnoses (38). Studies have also shown that veterans tend to have more numerous health problems and complications than the general population which also contributes to higher suicide risk (45).

Certain other characteristics, as shown in table-2, have been linked to suicide in war veterans include experience of severe physical or psychological trauma during war (46,47) and combat guilt (48). Bullman and Kang (47) assessed the risk of suicide in Vietnam veterans who were wounded and reported statistically significant increased risk of suicide among veterans who were wounded more than once and were hospitalized for a wound (RR = 1.82, 95% CI = 1.12, 2.96). The relative risk of suicide for those wounded two or more times than those wounded once was 1.50 (95% CI = 1.01, 2.24) but this risk increased, when the wounded personnel was hospitalized for the wounds. In the further analysis the researchers

found that White veterans who were wounded more than once and were hospitalized had more than a fivefold statistically significant increased risk for suicide compared to those hypothesized to be at least risk (i.e., non-White veterans wounded once and never hospitalized) (RR = 5.42,95% CI = 3.10,9.50). In another study of a cohort of Vietnam veterans with posttraumatic stress disorder, the same authors (46) also reported about sevenfold increased risk of suicide in comparison to the US population and a fourfold increased risk when comparisons involved Vietnam veterans with no diagnosis. Another population based in war veterans showed that compared to those with normal weight (BMI 20.0–24.9 kg/m2), overweight (BMI 25.0–29.9 kg/m2) male veterans were at lower risk of completing suicide (1).

Hendin and Hass (48) studied suicidal behaviour among Vietnam combat veterans with posttraumatic stress disorder (PTSD). They found that out of the 100 veterans, 19 had made a postservice suicide attempt, and 15 more had been preoccupied with suicide for a considerable part of their lives since they left the service. Comparisons between the suicidal and the nonsuicidal veterans showed similar frequency distributions of almost all PTSD symptoms. Factors which were significantly related to suicide attempts were guilt about combat actions, survivor guilt, depression, anxiety, and severe PTSD. Logistic regression analysis showed that combat guilt was the most significant predictor of both suicide attempts and preoccupation with suicide. Although there was no difference in the combat behaviour exposure between those who were suicidal and non-suicidal, it was seen that those veterans who felt out of control as a result of excessive fear or rage during considerable periods of their duty in Vietnam, including the situations in which their actions led to deaths of women and children had more combat guilt. Hence it was concluded by the authors, that it is not the combat exposure per say, but the affective state in which the combat behaviour was carried out was associated with combat guilt and suicide.

Studies done in former peace keepers have also shown that suicidal ideations are significantly associated with service stress exposure level and this relationship persist even after controlling for factors like repatriation status, negative life events, social support, alcohol consumption, and marital and occupational status. Further, service stress exposure and suicidal ideation was mediated by posttraumatic stress symptoms and general mental health problems combined (49). Studies done in former peacekeepers have shown an increased risk of suicide in personnel who did not complete their service period i.e., prematurely repatriated personnel (50, 51). This can be understood in the background of increased level of post-traumatic stress reactions, dissatisfaction and negative life events in repatriated personnel as shown in other studies (52).

In contrast to suicide being more common in older people in general population, studies done on war veterans have shown it to be more common in both older and younger subjects (43, 53). The higher risk in older subjects assumes further significance in the light of the fact that overall the proportion of elderly people is more in veteran population compared to general population (45). Other sociodemographic variable linked to high suicide risk includes single status. In a study on former peacekeepers it was found that lower marriage rate compared to the general population increased the risk of suicide (54).Studies in general population have shown that males are more likely to commit suicide. This factor assumes significance in the light of the fact that about 95% of veterans are males compared to slightly less than half in the general population; hence there is relatively higher suicide risk in

veterans as a group, compared to the general population (45). In one study education level of more than 12 years was found to be a predictor of suicide (1).

Table 2. Risk factors specific for suicide in war veterans

1. Presence of mental disorder (10), especially PTSD, Depression
2. Former active duty veterans (10)
3. Experienced severe physical trauma during war (46,47)
4. Deployment to a war zone/ experience of combat (55)
5. Younger age (33, 53)
6. Combat guilt (48)
7. Survivor guilt (36, 48)
8. Affective state in which the combat behaviour was carried out (48)

METHODS USED BY FOR SUICIDE BY WAR VETERANS

Data in general population shows that across all age groups, a firearm is the most common method to commit suicide, accounting for nearly 60% of all suicide deaths in both men and women in the United States. Drugs and medicaments are the second most common method of suicide in women and hanging is the second most common method in men (28). With regard to suicide attempt the most common method reported in all studies of serious suicide attempters is self-poisoning, accounting for more than 70% of all attempt followed by other methods like carbon monoxide poisoning and cutting or stabbing (28). This suggests that restricting access to firearms and prescription medications could result in a reduction of suicide rates (28).

Findings from the armed forces also shown that most of suicides are committed by using methods like gun shot (1, 10, 31, 32, 56-59), hanging and jumping/falls (10, 58).

Studies done in war veterans have also shown that the common methods used for committing suicide include use of fire arms, hanging (10, 54) and carbon monoxide poisoning (54). One study specifically evaluated the methods used for committing suicide and attempting suicide in inpatient veteran affair patients and found that hanging (31.4%), cutting with a sharp object (20.1%) and intentional drug overdose (18.9%), as the common methods used for suicide and suicide attempt and together these methods accounted for 71% of the total number of events. More than half of these events occurred in psychiatry units. In terms of completed suicide hanging accounted for 43%, drug overdose accounted for 36% and 9.5% were due to jumping from high places (60).

MODEL FOR SUICIDE IN WAR VETERANS

Meijer & Weerts (61) gave a model to understand the high rates of suicide and how this can be prevented. They linked the common risk factors like depression, PTSD and feelings of guilt with societal, social, individual factors with hidden constructs which they identified as “world-esteem” and “self-esteem”. They defined “world esteem” as the beliefs that the world is a right place to be, where rich cares for poor, strong cares for weak and goodness is being

rewarded and badness is being punished. “Self-esteem” was conceptualized as beliefs that the person himself is attractive, strong, honest and healthy. War trauma leads to people to realize that the world is not a safe place to be, and that their own personality is not as powerful or attractive as one thought and this leads to poor world-esteem and self-esteem. Societal factors refer to the recognition that the veterans receive after coming back from the war. If they come back from a successful operation they are welcomed and given recognition, however, participation in a lost war most of the time means lack of recognition from society. Social factors which influence the suicide include the lack of social support because many a times the military is rotated individually and lack of sharing of emotion or feeling of guilt because of such culture in the military. At the individual level the strong feelings of guilt interacts with other factors to making the decision of suicide.

According to this model the 4 most important things which influence the decision of suicide are PTSD, depression, world esteem and self esteem. PTSD and depression lead to poor world and self esteem, which in turn interacts with the social, societal and individual factors, which may further contribute to the poor self and world esteem and further worsening of PTSD and Depression, which ultimately leads the person to commit suicide. Hence according to this model suicide can be prevented by assessing the feelings of guilt, depression and PTSD at the individual level. At the social level there should be attempts to improve the social support from all the available sources and at the societal level the contribution of the war veterans should be recognized, where the veteran organizations and professional can contribute a lot, especially for the veterans of lot war.

PREVENTION OF SUICIDE

It is very important to formulate preventive strategies for prevention of suicide in war veterans. While planning to formulate the preventive strategies it is important to remember that there are certain risk factors for suicide which are common to both the general population and war veterans. Hence, some of the strategies used for suicide prevention in general population can be used for war veterans also, which include increasing the social support, treatment of mental illness and substance abuse and dependence, development of helplines, reduction of access to firm arms etc.

The strategies which could be specifically used for military personnel’s and war veterans have been listed in table-3. One of the important thing can be “welcoming the Veterans” coming back from war and peace keeping duties, so that they feel that their contribution is being appreciated by the society in general. Another important factor which could contribute to suicide prevention in veterans in reduction in stigma attached to mental illnesses, especially in armed forces. There is some evidence to suggest that in armed forces, PTSD is considered to “weak-fake-get-attention” and there is warrior culture, which prevents people to seek mental health services (62). Further, it is seen that in armed forces it is thought that seeking professional help for mental health problems can lead to loss of job (61). For example, in a review of suicide incidences in USA, team of military representatives and mental health professionals concluded that airmen feared losing their jobs and avoided seeking professional help because of the stigma associated with mental health problems and their treatment. Further, many airmen perceived that commanders and supervisors routinely viewed mental

health records, which reinforced the barriers due to the stigma. It was also concluded that the Air Force was losing one of its defining qualities, a supportive interconnectedness and problems with relationships, the law and finances played a part in an overwhelming majority of suicides. In view of the above preventive program was developed to reinforce individual coping skills, social support and interconnectedness and cultural norms that that would promote and protect responsible help seeking behaviour. After the intervention programme, in which a dynamic cohort of more than 5 million military personnel participated, the suicide risk was reduced by 33%. Besides that there was also reduction in accidental deaths, homicide, and family violence (63). Hence stigma reduction programmes should be planned to increase the awareness about mental illnesses in armed forces and veterans specifically.

Establishment of emergency help lines and counselling services especially for the veterans can be a major step to provide care for those with suicidal ideas and behaviors or suicidal attempt. As discussed earlier, many of the veterans are reluctant to seek help of formal mental health services, the telephone services may act as an appropriate alternative to conventional counselling. Studies from the countries were helplines were established specifically for the veterans have shown that, if such services are available, are useful in meeting the after-hours psychological of veterans. Data from Veteran Affair's toll-free, 24-hour Suicide Hot Line in USA showed that more than 22,000 veterans received help from the same and 1,221 suicides were prevented (62). In a 9 week monitoring study of the helpline from Australia it was found that significant number of Vietnam veterans experienced marked psychological difficulties at times when conventional counselling agencies are not accessible. On an average there were 30 calls per week which required counselling for psychological distress. Many of these calls were made in the late hours of the evening or early hours of the morning when most callers would presumably have little access to counselling support. It was also found that only 29% of callers were current clients of a formal counselling agency and overall 32% of callers were in formal therapy at the time of their call. It was also found that callers were less likely to be in therapy if they complained of substance abuse, traumatic memories, depression and anger at the government. Nearly one in five calls to the service required crisis intervention because of either threats to the caller's or others' safety. The author speculated that the problems associated with nightmares, traumatic memories, sleep disturbance, loneliness, and alcohol abuse may result in posttraumatic problems occurring at times when counselling agencies are typically not operating. Hence development of service that possesses specific training in veterans' trauma-related issues may have more relevance to veterans in times of crisis (64).

Many of suicides can also be prevented by screening the veterans immediately after coming back from the combat zones and kept under regular surveillance during the initial period. The veterans with mental illnesses like depression, PTSD and excess alcohol use should be considered as high risk group and should be asked to seek formal mental health counselling. In line with the same, in the recent times, Veteran affairs has implemented a policy to screen all OIF/OEF veterans for depression, PTSD, and alcohol abuse upon their initial visit to VA medical centers or clinics. Furthermore, screening for depression and alcohol abuse is required on an annual basis for all veterans, and screening for PTSD is required annually for the first five years after enrollment, and every five years thereafter. Veterans who screen positive for one of these conditions are required to receive a follow-up clinical evaluation that considers both the condition(s) related to the positive screen, and the risk of suicide. When this process confirms the presence of a mental disorder or suicide risk,

veterans are offered mental health treatment. Further, it is required that when there is a referral or request for mental health services, veterans must receive an initial evaluation within 24 hours. If this evaluation identifies an urgent need, treatment is to be provided immediately (65).

Table 3. Strategies for prevention of war veterans

Strategies in general for suicide prevention
1. Increasing the social support
2. Helplines
3. Stigma reduction programmes
4. Access to firearms
5. Treatment of mental illness
Strategies specific for suicide prevention in war veterans
6. Recognizing the contribution of the war veterans
7. Reduce stigma for mental illness in armed forces
8. Screening for mental illnesses immediately after return from the war/ peace keeping duty
9. Regular monitoring of this population for emergence of mental illness
10. Treating mental and physical illnesses adequately to minimum the disability
11. Identifying and surveillance of the high risk groups
12. Handling the survivor guilt
13. Shorter deployment duration

CONCLUSION

Despite increase in awareness of suicide in armed forces, especially in veterans, it has not been studied systematically. Till now there is no consensus as to whether the suicide rates are higher in the war veteran's compared to general population. However, there is some data to suggest that some of the risk factors like experience of combat, presence of combat guilt, severe physical trauma and higher prevalence of mental illnesses like depression and PTSD make this population more vulnerable to suicide. Hence suicide prevention programmes focusing specifically on these issues must be formulated.

REFERENCES

[1] Kaplan MS, Huguet N, McFarland BH, Newsom JT. Suicide among male veterans: a prospective population based study. *J Epidemiol Community Health* 2007; 61:619–624.

[2] Michel PO, Lundin T, Larsson G. Suicide rate among former Swedish peacekeeping personnel. *Mil Med.* 2007; 172:278-82.

[3] Pollock DA, Rhodes P, Boyle CA, Decoufle P, McGee DL. Estimating the number of suicides among Vietnam veterans. *Am J Psychiatry* 1990; 147:772-776.

[4] Boyle CA, Decoufle P. Postdischarge mortality from suicide and motor-vehicle injuries among Vietnam-era veterans. *N Engl J Med.* 1987; 317:506-507.

[5] Kang HK, Bullman TA. Mortality among US veterans of the Persian Gulf War: 7-year follow-up. *Am J Epidemiol*. 2001; 154:399-405.

[6] Kang HK, Bullman TA, Macfarlane GJ, Gray GC. Mortality among US and UK veterans of the Persian Gulf War: a review. *Occup Environ Med*. 2002; 59:794-799.

[7] Bell NS, Amoroso PJ, Wegman DH, Senier L. Proposed explanations for excess injury among veterans of the Persian Gulf War and a call for greater attention from policymakers and researchers. *Inj Prev*. 2001; 7:4-9.

[8] Thoresen S, Mehlum L. Risk factors for fatal accidents and suicides in peacekeepers: is there an overlap? *Mil Med*. 2004; 169:988-93.

[9] Rothberg JM, Bartone PT, Holloway HC, Marlowe DH. Life and death in the US Army. *JAMA* 1990; 264:2241-2244.

[10] Kang HK, Bullman TA. Risk of suicide among US Veterans after returning from the Iraq or Afghanistan war zones. *JAMA*, 2008; 300:652-653.

[11] Thompson R, Katz IR, Kane VR, Sayers SL. Cause of death in veterans receiving general medical and mental health care. *J Nerv Ment Dis.* 2002; 190:789-92.

[12] Lawrence CE, Reilly AA, Quickenton P, Greenwald P, Page WF, Kuntz AJ. Mortality patterns of New York State Vietnam Veterans. *Am J Public Health*. 1985; 75:277-279.

[13] Kogan MD, Clapp RW. Soft tissue sarcoma mortality among Vietnam veterans in Massachusetts, 1972 to 1983. *Int J Epidemiol.* 1988; 17:39-43.

[14] Anderson HA, Hanrahan LP, Jensen M, et al. *Wisconsin Vietnam Veteran Mortality study: final report.* Madison, Wisconsin Division of Health, 1986.

[15] Centers for Disease Control (CDC). *Postservice mortality among Vietnam veterans.* MWR Morb Mortal Wkly Rep, 1987; 36:61-64.

[16] Breslin P, Kang HK, Lee Y, Burt V, Shepard BM. Proportionate mortality study of US Army and US Marine Corps veterans of the Vietnam War. *J Occup Med.* 1988; 30:412-419.

[17] Holmes AP. West Virginia Vietnam *Veteran-Era Mortality study*. Charleston, West Virginia Health Department, 1986.

[18] Hearst N, Newmant TB, Hulley SB. Delayed Effects of the Military Draft on Mortality. *N Engl J Med* 1986; 314:620-4.

[19] Crane PJ, Barnard DL, Horsley KW, Adena MA. *Mortality of Vietnam veterans: the veteran cohort study*. A study of the 1996 retrospective cohort study of Australian Vietnam veterans. Canberra, Department of Veterans' Affairs, 1997.

[20] Wilson EJ, Horsley KW, van der Hoek R. *Australian National Service Vietnam Veterans Mortality and Cancer Incidence Study 2005*. Canberra: Department of Veterans' Affairs, 2005.

[21] Harrex WK, Horsley KW, Jelfs P, van der Hoek R, Wilson EJ. *Mortality of Korean War veterans: the veteran cohort study.* A report of the 2002 retrospective cohort study of Australian veterans of the Korean War. Canberra: Department of Veterans' Affairs, 2003.

[22] Macfarlane GJ, Thomas, E, Cherry N. Mortality among UK Gulf War veterans. *Lancet* 2000; 356:17–21.

[23] Kang HK, Bullman TA. Mortality among US veterans of the Persian Gulf War. *N Engl J Med* 1996; 335: 1498-504.

[24] Writer JV, DeFraites RF, Brundage JF. Comparative mortality among US military personnel in the Persian Gulf region and worldwide during Operations Desert Shield and Desert Storm. *JAMA*. 1996; 275: l18-121.
[25] Bullman TA, Mahan CM, Kang HK, Page WF. Mortality in US Army Gulf War veterans exposed to 1991 Khamisiyah chemical munitions destruction. *Am J Public Health.* 2005; 95:1382-1388.
[26] Last JM. A Dictionary of Epidemiology. New York, Oxford University Press, 1983.
[27] Kraemer HC, Kazdin AE, Offord DR, Kessler R, Jensen P, Kupfer D. Coming to terms with the terms of risk. *Arch Gen Psychiatry*, 1997; 54: 337-343.
[28] Moscick EK. *Identification of suicide risk factors using epidemiologic studies.* Psychiatr Clin North Am, 1997; 20:499- 517.
[29] Riddle JR, Smith TC, Smith B, Corbeil TE, Engel CC, Wells TS, Hoge CW, Adkins J, Zamoski M, Blazer D, for the Millennium Cohort Study Team. Millennium Cohort: The 2001-2003 baseline prevalence of mental disorders in the U.S. military. *J Clin Epidemiol.* 2007; 60: 192-201.
[30] Florkowski A, Gruszczynski W, Wawrzyniak Z. Evaluation of psychopathological factors and origins of suicide committed by soldiers, 1989 to 1998. *Mil Med.* 2001;166: 44-47.
[31] Allen JP, Cross G, Swanner J. Suicide in the Army: A review of Current information. Mil. Med. 2005; 170: 580- 584.
[32] Helmkamp JC. Suicides in the military: 1980-1992. *Mil Med.* 1995; 160:45-50.
[33] Zivin K, Kim HM, McCarthy JF, Austin KL, Hoggatt KJ, Walters H, Valenstein M. Suicide mortality among individuals receiving treatment for depression in the Veterans Affairs Health System: associations with patient and treatment setting characteristics. *Am J Public Health,* 2007; 97:2193-2198.
[34] Lehmann L, McCormick RA, McCracken L. Suicidal behavior among patients in the VA health care system. *Psychiatr Serv.* 1995; 46:1069–1071.
[35] Waller SJ, Lyons JS, Costantini-Ferrando MF. Impact of comorbid affective and alcohol use disorders on suicidal ideation and attempts. *J Clin Psychol.* 1999; 55: 585–595.
[36] Hyer L, McCranie EW, Woods MG, Boudewyns PA. Suicidal behavior among chronic Vietnam theatre veterans with PTSD. *J Clin Psychol.* 1990; 46:713-21.
[37] Desai RA, Dausey D, Rosenbeck RA. Suicide among Discharged Psychiatric Inpatients in the Department of Veterans Affairs. *Mil Med.* 2008; 173: 721-728.
[38] Lambert MT, Griffith JM, Hendrickse W. Characteristics of patients with substance abuse diagnoses on a general psychiatry unit in a VA medical center. *Psychiatr Serv.* 1996; 47:1104-1107.
[39] Hankin CS, Spiro A III, Miller DR, Kazis L. Mental disorders and mental health treatment among US Department of Veterans Affairs outpatients: the Veterans Health Study. *Am J Psychiatry.* 1999; 156:1924–1930.
[40] Schlenger WE, Kulka RA, Fairbank JA, Hough RL, Jordan BK, Marmar CR, Weiss DS. The prevalence of post-traumatic stress disorder in the Vietnam generation: a multimethod, multisource assessment of psychiatric disorder. *J Trauma Stress.* 1992; 5:333-63.

[41] Narrow WE, Rae DS, Robins LN, Regier DA. Revised prevalence estimates of mental disorders in the United States: using a clinical significance criterion to reconcile 2 surveys' estimates. *Arch Gen Psychiatry* 2002; 59:115-123.
[42] Kulka RA, Schlenger WE, Fairbank JA, Hough RL, Jordan BK, Marmar CR, Weiss DS. *Trauma and the Vietnam War generation*: Report of findings from the National Vietnam Veterans Readjustment study. New York: Bruner/Mazel, 1990.
[43] Hoge CW, Castro CA, Messer SC, McGurk D, Cotting DI, Koffman RL. Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *N Eng J of Med.* 2004; 351:13–22.
[44] Department of Veterans' Affairs. Media centre. Publications. Available at *http://www.dva.gov.au/health/research/morbidity/sumfind.htm* (Accessed February 2009).
[45] Lambert MT, Fowler DB. Suicide risk factors among veterans: Risk management in the changing culture of the department of Veterans affairs. *J Ment Health Adm*. 1997; 24:350- 358.
[46] Bullman TA, Kang HK. Posttraumatic stress disorder and the risk of traumatic death. *J Nerv Ment Dis.* 1994; 182:604-610.
[47] Bullman TA, Kang HK. The Risk of Suicide among wounded Vietnam Veterans. *Am J of Public Health.* 1996; 86:662-667.
[48] Hendin H, Haas AP. Suicide and guilt as manifestations of PTSD in Vietnam combat veterans. *Am J Psychiatry* 1991; 148:586-591.
[49] Thoresen S, Mehlum L. Traumatic stress and suicidal ideation in Norwegian male peacekeepers. *J Nerv Ment Dis*. 2008; 196:814-821.
[50] Ponteva M, Jormanainen V, Nurro S, Lehesjoki M. Mortality after the UN service. Follow-up study of the Finnish peacekeeping contingents in the years 1969–1996. *Int Rev Armed Forces Med Serv*. 2000; 73:235–239.
[51] Thoresen S, Mehlum L, Roysamb E, Tonnessen A. Risk factors for completed suicide in veterans of peacekeeping: repatriation, negative life events, and marital status. *Arch Suicide Res.* 2006; 10:353-363.
[52] Mehlum L, Weisaeth L. Predictors of post-traumatic stress reactions in Norwegian UN peace-keepers 7 years after service. *J Trauma Stress*, 2002; 15:17–26.
[53] Mancinelli I, Lazanio S, Comparelli A, Ceciarelli L, Di Marzo S, Pompili M, Girardi P, Tatarelli R. Suicide in the Italian military environment (1986-1998). *Mil Med.* 2003;168:146-52.
[54] Thoresen S, Mehlum L, Moller B. Suicide in peacekeepers--a cohort study of mortality from suicide in 22,275 Norwegian veterans from international peacekeeping operations. *Soc Psychiatry Psychiatr Epidemiol.* 2003; 38:605-10.
[55] Herman JL. *Faunia atid recovery*. New York: Basic Books, 1992.
[56] Levin A. *Dramatic Increase Found in Soldier Suicides.* Psychiatr News, 2007; 42: 9.
[57] Mahon MJ, Tobin JP, Cusack DA, Kelleher C, Malone KM. Suicide among regular-duty military personnel: a retrospective case-control study of occupation-specific risk factors for workplace suicide. *Am J Psychiatry.* 2005; 162:1688-96.
[58] Scoville SL, Gubata ME, Potter RN, White MJ, Pearse LA. Deaths attributed to suicide among enlisted U.S. Armed Forces recruits, 1980-2004. *Mil Med.* 2007; 172:1024-31.
[59] Stander VA, Hilton SM, Kennedy KR, Robbins DL. Surveillance of completed suicide in the Department of the Navy. *Mil Med.* 2004; 169:301-6.

[60] Mills PD, DeRosier JM, Ballot BA, Shepherd M, Bagian JP. Inpatient suicide and suicide attempts in Veterans Affairs Hospitals. *Jt Comm J Qual Patient Saf.* 2008; 34: 482-488.

[61] Meijer M, Weerts MP. Suicide among Veterans: Research, Models and Data. North Atlantic Treaty Organization, 2004 (*ftp://ftp.rta.nato.int/PubFullText/RTO/MP/RTO-MP-HFM-108/MP-HFM-108-05.pdf.)*

[62] Arenofsky J. *Escape to Nowhere: Veterans and Suicide* VFW Magazine, November 2008.

[63] Knox KL, Litss DA, Talcott GW, Feig JC, Caine ED. Risk of suicide and related adverse outcomes after exposure to a suicide prevention programme in the US Air Force: cohort study. *BMJ*. 2003; 327: 1376-1380.

[64] Bryant RA. An analysis of calls to a Vietnam Veterans' telephone counselling service. *J Trauma Stress,* 1998; 11: 589-598.

[65] Sundararaman R, Panangala SV, Lister SA. Suicide prevention among Veterans. CRS report for Congress, May 5, 2008 *(http://assets.opencrs.com/rpts/ RL34471_20080505.pdf)*

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 18

THE INTERPERSONAL-PSYCHOLOGICAL THEORY OF SUICIDAL BEHAVIORS AS AN EXPLANATION OF SUICIDE AMONG WAR VETERANS

Lindsey L. Monteith, Kelly L. Green and Amanda R. Mathew
University of Houston, Texas, USA

Jeremy W. Pettit
Florida International University, Florida, USA

ABSTRACT

War veterans are at elevated risk of suicide, nonfatal suicide attempts, and suicidal ideation. Suicide is a leading cause of death among veterans. Understanding protective and risk factors for suicide in this high risk group is of great clinical importance, particularly considering the increasing number of war veterans in the United States. The interpersonal-psychological theory of suicide (1) is presented as an explanatory model of suicide in war veterans. In this model, a desire for suicide, comprised of an unmet basic need to belong and a perceived sense of burdensomeness to close others, and the acquired competence to inflict potentially fatal self-harm interact to confer risk for suicide. This chapter describes each component of the interpersonal-psychological theory and its relevance to war veterans. The interpersonal-psychological theory of suicide provides a promising framework to explain suicide in war veterans and may inform the development of screening, prevention, and intervention strategies. Clinical implications derived from the theory and directions for future research are discussed.

INTRODUCTION

A substantial body of evidence indicates that veterans, compared to non-veterans, are at greater risk of death by suicide. Pioneering work in this area was conducted by Pokorny in the 1960s (2, 3, 4). In a series of studies on male veterans who had received services at VA

hospitals, he reported elevated suicide rates of 50 per 100,000 among general medical patients, 250 per 100,000 among psychiatric inpatients, and 740 per 100,000 among those who had presented for a psychiatric consult due to suicidal ideation, threats, or attempt (2, 3). A history of suicidal behaviors (e.g., ideation, past nonfatal attempt) among male veterans was associated with a 35-fold increased risk of suicide (3). In one exception to these findings, Pokorny reported a suicide rate of 21.7 per 100,000 among community-residing male veterans in Texas, which did not differ from the general male population rate at the time; however, veterans with a psychiatric illness experienced suicide rates of 192.9 per 100,000, suggesting that the initial discrepant finding might be explained by the use of a primarily non-psychiatric sample (4). Among veterans in various hospital settings between 1959 and 1966, suicide rates of 16 per 100,000 were obtained, which exceeded the general population suicide rate during that time (5). However, when suicide rates were compared by type of hospital, suicide rates of 6 per 100,000 were found for general medical and surgical hospitals, while suicide rates of 72 per 100,000 were found for neuropsychiatric hospitals (5). Firearm was most frequent method of suicide observed among those who died by suicide in the community, while hanging and jumping represented the most common method of suicide in hospital settings.

Recent research has confirmed Pokorny's and others' findings of elevated rates of suicide among veterans. In a representative sample of the U.S. population, veteran status conveyed a two-fold likelihood of death by suicide among males (6). Veterans who died by suicide were more likely to use a firearm (83.5%), compared to non-veterans (55.1%). Another epidemiological study indicated that the rate of suicide among male Vietnam veterans was 1.5 times higher than that of males of similar age who were not Vietnam veterans (7). Pollock and colleages estimated that, from time of discharge until the early 1980s, between 8,000-9,000 Vietnam veterans died by suicide (7).

The majority of research conducted on suicidal behaviors in veterans has occurred among clinical samples in VA hospitals, where suicide rates are typically higher than in community settings. Of 1,075 deaths by veterans who previously received treatment at a VA Medical Center in Philadelphia, 19 were confirmed or suspected to have occurred by suicide, with a suicide rate of 52 per 100,000, two to three times higher than general male population suicide rates (8). High rates of psychiatric disorders in the sample were suggested as the cause of the elevated rate. Consistent with the general population study (6), firearms were the most common method of suicide, followed by hanging and drowning. From 1999 to 2004, 1,683 of 807,694 depressed veterans who received treatment at a VA were identified as having died by suicide (9). Suicide rates were 89.58 per 100,000 for male veterans, 28.92 per 100,000 for female veterans, and 174.83 per 100,000 for veterans with a psychiatric hospitalization in the year prior to study entry.

Consistent with the elevated rates of suicide, studies have found that suicide is one of the leading causes of death among veterans. Suicide accounted for 13.4% of deaths experienced within a year of discharge by psychiatric veteran inpatients previously hospitalized at one of 128 VA hospitals (10). Over 8% of the deaths of veteran males who had received residential PTSD treatment occurred as a result of suicide (11). In an investigation of the causes of death among veterans who had received any services at VA medical centers (including non-psychiatric services), 1.1% of deaths were confirmed or suspected to be due to suicide, with 0.9% confirmed to be due to suicide (12). Although that represents a small percentage of total deaths, it greatly exceeds the percentage of deaths attributable to suicide in the general population.

The vast majority of suicide research in veterans has been descriptive and correlational, which makes it difficult to determine specific causes of increased suicide risk. In an attempt to determine whether veteran status was causally related to suicide risk, Hearst and Newman conceptualized the 1970-1972 draft lottery for the Vietnam War as a natural experiment, comparing males who were randomly assigned to the Vietnam draft to those who were not (13). Those eligible for the draft solely based on their date of birth were more likely to die from suicide or a traffic accident; the groups did not differ on rates of death due to other causes, suggesting that this group experienced a uniquely increased risk for death by suicide or traffic accident (13). Males randomly assigned to the draft experienced increased mortality rates (4%), due to increased rates of death by suicide (13% higher) and vehicular accident (8% higher) (14). The researchers further estimated that actual veterans were 65% more likely to die from suicide and 49% more likely to die from vehicular accidents, as compared to men who were not eligible for the draft (14). Additionally, the increased risk for suicide continued to occur even thirteen years afterwards (13). The researchers concluded that draft eligibility was casually related to increased suicide rates observed amongst Vietnam War veterans.

In addition to experiencing elevated rates of suicide, nonfatal suicide attempts and suicidal ideation are experienced at high rates by veterans. Among a large national sample of patients seeking substance treatment at the VA, 4% reported a nonfatal suicide attempt in the past month (15). Over 7% of veteran primary care patients at a VA Medical Center reported current suicidal ideation (16). Clearly, suicidal behaviors occur at a high rate among veterans and are especially prevalent in veterans with psychiatric diagnoses. Understanding risk and protective factors for suicide in this high risk group is therefore of great clinical importance, particularly in light of the large and growing number of recent war veterans in the U.S. A comprehensive theory which can address the high rates of suicidal behavior among war veterans may inform the development of screening, prevention, and intervention strategies. In the remainder of this chapter, the interpersonal-psychological theory (1) is presented as an explanatory model of suicide in war veterans, followed by a discussion of clinical implications derived from the theory.

INTERPERSONAL-PSYCHOLOGICAL THEORY OF SUICIDE: AN OVERVIEW

The interpersonal-psychological theory of suicide (1) provides a promising framework in which to understand and explain suicide in war veterans. This theory posits that there are two necessary dimensions that confer the greatest risk for suicide: (a) a desire for suicide and (b) the acquired competence to inflict potentially fatal self-harm.

The dimension of suicidal desire is thought to be comprised of two factors: an unmet basic need to belong and a perceived sense of burdensomeness to close others. It has been argued that a feeling of belonging is a basic human goal and motivator which leads to negative outcomes when unfulfilled (17). To maintain a sense of belonging, individuals must not only have a regular occurrence of positive interpersonal interactions, but must also perceive that others care for them (17). The model proposes that a lack of belongingness increases an individual's risk for suicide, and that, in fact, suicide may be a negative outcome of unmet belongingness in and of itself (1). Consistent with this idea, social isolation and

withdrawal are common experiences for individuals who eventually die by suicide (18). It also has been suggested that when this need is met, it functions as a protective factor against suicidal behaviors (19).

The perception that one is ineffective and poses a burden or liability to others is the second factor that contributes to the development of suicidal desire in the interpersonal-psychological theory. Feelings of burdensomeness may stem from medical, psychiatric, or financial problems that can functionally limit an individual. Thus, suicide may be considered as a solution to relieve others of a perceived burden. Consistent with this theory, research has found that, compared to those who engage in non-suicidal self-injury (i.e., self-harm that does not involve suicidal desire), those who attempt suicide more often cite reasons that have to do with lessening the perceived burden that they impose on others (20). Moreover, a perceived sense of burdensomeness has been found to be associated with an elevated risk for suicide and greater lethality of suicide attempt in non-veteran samples (21, 22; 23). In research by Joiner and colleagues (23), suicide notes left by those who died by suicide and those who made nonfatal attempts were rated for perceived burdensomeness to others in addition to other constructs known to be associated with suicide such as hopelessness, viewing suicide as regulator of negative affect, and emotional pain in general. Perceived burdensomeness was the only variable that was significantly related to suicide; thus, the suicide notes written by those with a fatal, compared to non-fatal, suicide attempt were characterized by more expressions of burdensomeness. Further, perceived burdensomeness was also the only factor that predicted lethality of suicide attempt. A second study of clinical outpatients revealed that perceived burdensomeness predicted both current levels of suicidal ideation and suicide attempt status above and beyond depressive symptoms and hopelessness, both of which are well-established, robust predictors of suicide (22).

Whereas suicidal desire in the form of thwarted belongingness and perceived burdensomeness is viewed as a necessary factor in the path to suicide, it is not sufficient. Rather, suicidal desire works in conjunction with the second dimension of the interpersonal-psychological model: The acquired capacity to carry out fatal suicidal behaviors. This capacity can be developed via a number of pathways; however, all pathways require that the individual habituate to the various negative consequences of suicide (e.g., fear, potential physical pain) through exposure to them over time (1). Direct pathways of acquiring this competence include practice with suicide, such as violent behavior, aborted suicide attempts, non-suicidal self-injury, or attempting suicide with less lethal methods. Direct exposure to suicide-related behavior and physical pain may lead an individual to develop an increased tolerance for pain, and research has demonstrated that suicidal individuals display a higher physical pain tolerance than those without suicidal ideation (24). Other, more indirect, pathways of the acquisition to lethally harm oneself may include: observation of physical pain, performing behaviors that involve physical pain (but are not self-injurious in nature), impulsivity, and the experience of emotional pain (19).

While there is growing empirical support for individual components of the interpersonal-psychological model, the theory as a whole has also recently been investigated and supported in a clinical sample. The study first demonstrated that the relationship between “thwarted belongingness” and suicidal ideation was significant only in conjunction with high levels of perceived burdensomeness, supporting the notion that both factors are necessary to the dimension of suicidal desire (25). The study also demonstrated that exposure to and practice with painful experiences predicted acquired competence to complete suicide. Further, the

interaction of the two dimensions (suicidal desire and acquired competence) accounted for more variance in clinician-rated suicide risk than all other risk factors; however, acquired competence did not predict risk without high levels of perceived burdensomeness. Thus, the hypothesis that both dimensions act together to confer risk for a lethal suicide attempt was supported in a non-veteran sample.

In the following sections, we discuss the relevance of the interpersonal-psychological model to war veterans. Because of its relative youth, the theory has not yet been tested among veterans. Many of the conjectures in this chapter are just that – conjectures. Although they are theoretically derived and we base them on science whenever possible, we emphasize the need for empirical investigation among war veterans before drawing firm conclusions about the theory's explanatory power in this population.

INTERPERSONAL-PSYCHOLOGICAL THEORY OF SUICIDE AS APPLIED TO WAR VETERANS

In the sections that follow, we separately discuss each component of the interpersonal-psychological theory and its relevance to war veterans. We begin with a perceived sense of burdensomeness toward others.

Perceived Burdensomeness. Perceived burdensomeness has been found to be associated with suicidal ideation in a number of studies (21, 26). It has also predicted suicide versus nonfatal suicide attempt and greater lethality of method of attempt (23). The latter finding is especially concerning, considering that veterans are more likely to own and have knowledge about firearms in addition to being more likely to use firearms as a method of suicide compared to non-veterans (27, 6).

Having the sense that one is a burden to others may be an especially important risk factor for suicide in veterans. A high proportion of war veterans, as compared to civilians, may rely on others for caretaking due to health-related concerns and disabilities sustained in service, including both physical and mental health problems. It has been found that the percentage of veterans who die from combat-related injuries is decreasing over time (22% in World War II to 16% in Vietnam to 8.8% in the recent wars in Iraq and Afghanistan), suggesting that there is now a larger proportion of veterans living with the effects of their injuries (28). Recent estimates from the National Referral Program indicate that veterans have a high prevalence of a wide variety of health concerns (29). The most common diagnoses were: chronic fatigue syndrome (43%), depression (40%), prolonged PTSD (38%), and headaches (26%). Chronic pain is also prevalent in veterans, with a 21% prevalence rate, and may be especially relevant as a means of habituating to pain, thus increasing suicide risk. Notably, 19% of veterans in this study received 81-100% service-connected disability for their medical problems (29). Traumatic brain injury is another highly prevalent physical injury in recent war veterans, estimated at around 19% (30). Clearly, physical and psychiatric health problems occur at a high rate in veteran populations. To the extent that these problems are accompanied by functional impairment and disability, it is possible that war veterans may perceive themselves as burdens to those who care for them. For example, due to limitations and disability, veterans may not be able to function in the roles they once occupied (e.g., employment). Research links psychiatric diagnosis and disability to unemployment for veterans, such that the

probability of employment is reduced (31, 32, 33). The loss of functioning by veterans in such a major domain (i.e., as a financial provider) may impart financial stress on their families. In conjunction with physical and mental disabilities, inability to work may further contribute to the development of a sense of burdensomeness toward loved ones.

Consistent with this possibility, veterans who have activity limitations (e.g., unable to work due to physical or mental disability) are more likely to die by suicide than veterans who do not have such limitations (6). Additionally, veterans with PTSD who have a history of suicide attempt report lower levels of vitality and health than those with PTSD and no suicide history (34). This suggests that veterans' actual and perceived health and functional limitations as a result of physical and psychiatric impairments are related to suicide. Although it has not been tested directly, it is possible that a perceived sense of burdensomeness toward others may partially account for the higher rates of suicidal behaviors in veterans with disabilities. For example, a low sense of self-efficacy (which has some conceptual overlap with perceived burdensomeness) has been linked to suicidal ideation and attempt in veterans (35). Qualitative research also provides anecdotal support for the notion that burdensomeness is associated with suicidal behaviors in veterans. To wit, veterans endorsed perceived burdensomeness through stress about not being able to provide for their families and feeling a sense of self-loss after being discharged from the military (36). They described viewing civilian responsibilities as less important than their combat duties and expressed concerns that they had lost purpose. Those interviewed specifically spoke of feeling burdensome to family and friends, particularly because they could not provide the financial support they once had (36). These veterans endorsed past suicidal behavior, some as an explicit coping mechanism to deal with the perception of being a burden to loved ones.

In addition to direct reports from veterans, individuals who serve in caregiver roles for veterans with physical and mental disability also report feeling financial and emotional burdens as a result of their loved ones' disabilities (37). The majority of this research has been conducted with caregivers of veterans with PTSD, and a sense of burden has been associated with caregiver psychological distress (37, 38, 39). Thus, not only do some veterans perceive that they are a burden on their loved ones, but their caregivers also report feeling burdened by their caretaking responsibilities. Veterans' observations of the burden placed on caregivers or direct communications from caregivers regarding the burdens caused by their disabilities may represent another mechanism by which veterans develop the perception that they are a burden to loved ones.

Thwarted Belongingness. An individual's sense of social belongingness is the second of the three major components of the interpersonal-psychological theory. Whereas a sense of belongingness is thought to serve as a protective factor from suicide, perceived alienation from others is posited as a risk factor for suicidal behavior. Consistent with this possibility, a common finding throughout the suicide literature is that those who die by suicide experienced isolation and withdrawal from others prior to their death (18). Individuals often experience failed belongingness as an intense feeling of loneliness, and research has demonstrated a clear relationship between loneliness and suicide (25, 40, 41, 42, 43, 44, 45).

For war veterans, perceived belongingness may be an especially salient issue. Social connections among war veterans may be influenced by "pulling together" effects, which have been shown to foster feelings of belongingness in individuals with meaningful shared experiences (46). Research has found support for pulling together effects in the general population during times of war and national crises (47, 48, 49), and these effects may be

amplified in veterans who were personally involved in military service. Brenner and colleagues explored the dimension of belongingness in a qualitative study of recent veterans (36). The researchers found that, after serving in the military, veterans often reported a sense of social connectedness to one another. As one veteran stated, "All you have is each other, and it's such a tight bond, it's awesome" (p. 219). Veterans reported that sharing difficult experiences is an important factor in feeling belongingness with other military personnel, even after discharge. However, to the extent that war veterans are separated from their military connections after returning to civilian life, that shared sense of belongingness may be difficult to maintain.

Indeed, although veterans may feel connected to others who have served in the military, they often experience a sense of alienation from friends and family. A commonly reported experience of veterans is a sense of confusion about how to re-integrate into civilian society (36). Feelings of disconnection from those not in the military are particularly evident among veterans who have experienced active combat. As a multiple-combat veteran expressed, "I separate myself from society, that part of society. I don't know how to deal with those people…I just keep myself away" (p. 219). Hence, it seems plausible that war veterans who are no longer actively involved in the military may feel as though they have lost their niche of belongingness and experience considerable difficulty developing a sense of belongingness among other civilians.

Although thwarted belongingness per se has received very little investigation among war veterans, research on related constructs supports the notion that it may increase the risk of suicide. Among war veterans, poor social support (which could be seen as a proxy for low belongingness) has been associated with negative psychiatric outcomes in general, and with suicide risk specifically (27, 50). The Veterans Health Study (51) concluded that low perceived social support had important implications for veterans' functioning after discharge: Veterans with a higher perception of social support reported higher functioning on various measures of both physical and mental health.

Military veterans face several challenges in obtaining social support after discharge, specifically in the domains of marital and family relationships. Combat exposure is associated with marital conflict and a heightened incidence of intimate partner violence (52, 53). Additionally, military combat is related to a wide range of marital adversity, including separation, divorce, infidelity, and abuse (54). Military veterans may also experience decreased social support in the family domain. Symptoms of emotional numbing, detachment, and poor interpersonal problem solving skills that can follow combat experience have been demonstrated to negatively affect the marital relationship, lead to poorer parent-child relationship quality, and promote feelings of estrangement from family members (53, 55, 56, 57). These challenges in marital and family relationships may place war veterans at high risk for developing a sense of failed belongingness in close relationships and, consequently, heightened risk of suicidal behaviors.

Acquired capability to enact lethal self-injury. The final component of the interpersonal-psychological theory is the acquired capability to enact lethal self-injury. According to the theory (1), the capacity for self-harm is acquired through a succession of painful and provocative experiences, which results in habituation to pain and fear regarding self-injury, as well as increased courage and competence regarding one's ability to inflict self-directed harm. The most direct route to acquiring this capacity involves suicidal behaviors; however, the capability to self-harm can also develop as a result of any repeated experience with pain.

As such experiences accumulate, the capacity for self-harm and ensuing risk for suicide increase. Thus, the ability to fatally harm oneself is acquired through a succession of experiences involving pain.

One of the proposed paths to acquiring the capacity for lethal self-harm is through exposure to violence, either directly or vicariously. Individuals who have been exposed to more frequent or intense encounters with violence (inflicted by themselves or others) would be expected to experience increased suicide risk, as compared to those who have lacked such exposures. Thus, active participation in or even observation of violence is theorized to confer risk for suicide. Both direct experience and observational pathways may be particularly relevant to combat veterans, who typically face a great deal of exposure to pain and violence, which could quickly bring about habituation.

Research conducted with Vietnam War veterans has consistently revealed that the majority of veterans in clinical samples witnessed or participated in violence. In an inpatient sample of veterans, 91% reported participating in violence, 86% reported witnessing abusive violence (e.g., mutilating bodies), and 75% reported either witnessing or being involved in killing someone (58). Moreover, over 50% indicated that they had killed a Vietnamese person "at least once every 2 weeks during their combat tour" (p. 132). Similar estimates were reported in an outpatient sample of Vietnam veterans diagnosed with PTSD, with 93% reporting participating in or witnessing abusive violence (59). Finally, in a community sample, 7.6% of veterans reported engaging in severe violence (e.g., killing civilians, torturing hostages) during the Vietnam War (60).

Consistent with the potency of direct experience with violence in predicting later suicidal behaviors, acting as an "agent of killing" or failing to prevent killing was more strongly related to suicide attempts than having acted as an observer or target of killing (61). The researchers distinguished these roles as varying in the degree of responsibility involved: Behaviors that required a more active role (or greater responsibility) were associated with increased suicide risk. An alternative, but not mutually exclusive, explanation is that more direct exposure to violence leads to habituation to violence over time, which increases the capacity for self-harm and thereby confers greater risk for suicide. Consistent with this possibility, engaging in violence during the Vietnam War predicted higher rates of post-war suicidal behaviors in an inpatient sample of veterans, with 50.6% having made at least one suicide attempt (58).

Bullman and Kang investigated the relationship between trauma exposure during combat and subsequent suicide in a large sample of Vietnam veterans (62). Frequency and severity of injury during the war was related to suicide risk, such that veterans who had sustained two or more wounds were more likely to die by suicide than those who had been wounded only once. Additionally, Vietnam veterans hospitalized for a wound incurred during the war were at increased suicide risk during the follow-up period, as compared to those who were not hospitalized. Finally, veterans at greatest suicide risk had been wounded at least twice and were hospitalized for such injuries, whereas the lowest suicide risk was experienced by those with a single episode of injury not requiring hospitalization. Although alternative explanations cannot be ruled out (e.g., a higher number of injuries increased suicide risk via greater functional impairment and hopelessness), the experience of being injured multiple times may have habituated veterans to the fear and pain associated with injury, including injury to one self.

For many war veterans, suicidal behaviors, including ideation and attempts, often accompany PTSD. In an inpatient sample of veterans diagnosed with PTSD, suicidal ideation was reported by 69%, while a recent suicide attempt (i.e., past six months) was reported by one-fourth of the sample (63). Among Vietnam veterans in a separate study, the presence of PTSD was related to current suicidal ideation and a history of attempting suicide (64). A separate examination of Vietnam combat veterans diagnosed with PTSD indicated that 15% reported frequent preoccupation with suicide, while an additional 19% reported making at least one suicide attempt; 3% subsequently died by suicide (65). Another study found that current suicidal ideation was related to PTSD re-experiencing symptoms in veterans (66). One possible explanation for these findings is that re-experiencing results in habituation to violence, particularly if the memory being re-experienced involves one in which the person experienced pain or injury to self or others.

In addition to direct links between exposure to violence and suicidal behaviors, research supports the notion that exposure to violence may indirectly increase the risk of suicide. For example, PTSD resulting from violence exposure in war veterans is associated with more favorable attitudes toward violence as well as more violent and aggressive behaviors, which is consistent with the notion that these individuals have habituated to violence (67, 68). Veterans with chronic PTSD, compared to those without, are more likely to own more handguns and report more experiences involving firearms. Additionally, they are more likely to report "considering suicide with firearms" and "loading guns with the purpose of suicide in mind" (68). Finally, veterans in a recent qualitative study reported an increase in their pain tolerance following exposure to combat situations (36).

According to Joiner's theory (1), the means chosen by veterans in their suicide attempts should become progressively more lethal with greater exposure to pain and provocation. Thus, with increased suicide attempts, severity of attempts should become more lethal. While no available research has directly addressed this question among veterans, it is clear that the methods used by veterans in their attempts are often high in lethality.

A number of studies with inpatient, outpatient, and community samples of veterans indicates that firearms are the most common method of suicide in these populations (2, 5, 6). The increased exposure to weapons, including guns, experienced by veterans in training and combat may predispose them to suicide risk, as they are "habituating to danger by…repeatedly being exposed to cues associated with danger" (1, p. 83). According to Joiner, "having guns around acquaints people – renders them fearless – about a potentially lethal stimulus" (1, p. 83). Thus, veterans who have had more exposure to and experience with guns may have acquired the ability and courage to enact self-injury and would be expected to be more capable of inflicting self-harm in the presence of suicidal desire.

In summary, direct participation in and observation of violence is a common experience for veterans of war. Such exposure to violence is important because repeated experiences with violence, even when directed toward others, may result in habituation and the acquisition of the capacity for self-harm. While exposure to painful experiences is posited as a requisite component to self-injury, it is not, in itself, sufficient to result in suicidality. The acquired ability to inflict self-harm must be accompanied by suicidal desire (developed by perceptions of burdensomeness and not belonging). Thus, although exposure to pain and violence is often concomitant with military service, particularly in combat, this alone does not mean that all veterans who experience such violence will self-harm; however, should they experience a

lack of belongingness and feelings of burdensomeness, their previous experiences with violence predisposes them to increased risk for inflicting self-injury, including suicide.

CLINICAL IMPLICATIONS OF THE INTERPERSONAL-PSYCHOLOGICAL THEORY

The interpersonal-psychological theory offers potentially important guidance for the assessment and prevention of suicidal behaviors. In addition to assessing well-known risk factors for suicide, such as mood disorders, PTSD, substance use disorders, hopelessness, and recent negative life events, clinicians may wish to focus on war veterans' social relationships and access to potentially lethal methods of suicide. Key issues for working with war veterans derived from the interpersonal-psychological theory include the extent to which veterans perceive themselves to be connected to a social group and the extent to which they believe they are contributing, rather than draining, resources from loved ones.

Social belongingness may take any number of forms and could include a sense of connection to fellow veterans, family members, co-workers, neighbors, or community organizations (e.g., religious, political, recreational groups, and so on). The presence of such connections may operate as a protective factor and reduce the risk of suicidal behaviors in the presence of other risk factors. In contrast, the absence of such social connections may alert clinicians to a heightened risk of suicidal behaviors.

Similarly, burdensomeness may be experienced in a number of domains, including guilt over financial encumbrances, employment status, physical limitations, the need for family members to provide care, or the perception that one simply is not carrying his or her share of the load with everyday responsibilities. Conversely, the perception that one contributes to the functioning and well-being of a unit may serve as a protective factor in the face of other risk factors. Although certain limitations and disabilities experienced by war veterans may actually place constraints on others, the subjective perception of burdensomeness may be a more salient risk factor than objective indices of burden.

Given the high probability that war veterans will have accrued substantial experience with violence and will therefore have habituated to some of the fear related to injuries (possibly even self-injury), a crucial component of suicide risk assessment with war veterans is (a) determining their access to potentially lethal methods of suicide and (b) collaborating to reduce their ease of access to such methods. Among war veterans who endorse suicidal desire, this would entail a discussion of firearms in the home, large quantities of potentially lethal medications, and so on. In the event that highly lethal methods are readily available, clinicians may discuss strategies for restricting access to them, at least until suicidal desire has decreased. For example, enlisting the assistance of family members or friends in keeping firearms or supplemental medications may be a short-term strategy during crisis periods.

In addition to assessment, a number of therapeutic targets are highlighted by the interpersonal-psychological theory. The main targets of treatment based on this model are the components of perceived burdensomeness and thwarted belongingness. Although the ability to inflict self-harm is another component of the model, it is likely to be relatively stable and thus not a good target of intervention (though preventative efforts aimed at deterring future episodes of self-injury are important). Further, it is not clear if and how individuals could

become re-sensitized to the aversion of self-inflicted harm. In contrast, an individual's sense of burdensomeness and belongingness are not static and may be modified. Several therapeutic techniques have been developed to address the constructs of belongingness and effectiveness. Joiner (2005) describes a cognitive process of restructuring negative thoughts, in which maladaptive beliefs about belongingness and burdensomeness are challenged and replaced with more adaptive ways of thinking (1). This process may help decrease the intensity of emotional pain and direct individuals away from reasons for suicide. In working with a veteran population, one could challenge thoughts specific to the two constructs, such as, "I am disconnected from others who cannot understand my experiences," or "I cannot be useful outside of military life." Another technique is the creation of a crisis card, which provides steps the individual can take during emotional crisis (69). The card may identify behaviors that foster feelings of connectedness and effectiveness for the specific individual (e.g., seeking support from a friend, engaging in a favorite activity), as well as alternatives to common negative thoughts.

Traditional behavioral activation techniques used in the treatment of depression (e.g., 70) could also be beneficial in promoting feelings of social belongingness. To a certain extent, a sense of belongingness may naturally follow increased or renewed activity in social settings, such as re-establishing friendships, participating in community-based organizations, and so on. In addition, family therapy could be a useful approach to enhance social belongingness and increase a sense of contribution to loved ones. Furthermore, involvement of family members in the therapeutic process may foster a sense of connection with family, provide material that challenges veterans' perceptions that they pose a burden to family members, and might also bring to light meaningful contributions that veterans have overlooked. Similarly, therapy tasks may focus specifically on identifying ways in which veterans contribute to the well-being of family, community, and society.

CONCLUSION

In this chapter, research on the prevalence of suicidal behavior among war veterans was presented and explained from the interpersonal-psychological theory of suicide (1). Forty years of research examining suicide in war veterans clearly documents their elevated rates of suicidal behavior, including suicidal ideation, nonfatal suicide attempts, and suicide. These consistent findings highlight the importance of developing a theory which can shed light on the processes leading to suicide in veterans. Additionally, considering the recent influx of war veterans returning from Iraq and Afghanistan, the ability to identify protective and risk factors to deter veterans from suicide is especially timely. The interpersonal-psychological theory of suicide represents an encouraging step toward meeting this need.

As reviewed in this chapter, exposure to violence is a common experience among veterans and may result in habituation to pain and the acquisition of the ability to self-harm. Additional experiences which can desensitize veterans to violence include injury, exposure to weapons, and re-experiencing symptoms associated with PTSD (e.g., flashbacks). Whereas exposure to violence during training and active duty could theoretically increase suicide risk via habituation to violence and pain, post-war experiences might confer risk for suicide by increasing suicidal desire. Problems with physical or mental health, coupled with a

diminished ability to work and potential needs for caretaking and reliance on others might result in perceptions of burdensomeness. Veterans transitioning from military to civilian life also may experience perceived alienation due to difficulty reintegrating into society, marital adversity, and decreased social support.

Clinical implications derived from the interpersonal-psychological theory of suicide were discussed. Strategies targeting perceptions of burdensomeness and ineffectiveness may involve cognitive or behavioral techniques and are likely to be especially beneficial to reducing suicide risk in war veterans. The acquired capacity for self-harm, on the other hand, poses a greater challenge and is likely to be more difficult to change; strategies for addressing this are likely to be indirect and include suicide risk assessments, increasing effective coping strategies, and restricting access to potentially lethal means, especially firearms and medications.

The interpersonal-psychological theory of suicide (1) offers a unique explanation of the high rates of suicidal behavior in veterans, while also providing strategies to detect, prevent, and intervene with suicidal veterans. Although empirical support exists for both the integrated model as well as individual dimensions of the theory, such research has been conducted primarily with non-veteran samples; thus, empirical investigation of the applicability of this theory to war veterans represents an important area for future research.

REFERENCES

[1] Joiner TE. *Why people die by suicide*. Cambridge, MA: Harvard University Press; 2005.

[2] Pokorny AD. Characteristics of forty-four patients who subsequently committed suicide. *Arch Gen Psychiatry*. 1960;2:314-323.

[3] Pokorny AD. A follow-up study of 618 suicidal patients. *Am J Psychiatry*. 1966;122:1109-1116.

[4] Pokorny AD. Suicide in war veterans: rates and methods. *J Nerv Ment Dis*. 1967;144(3):224-229.

[5] Farberow N, Ganzler S, Cutter F, Reynolds D. An eight-year survey of hospital suicides. *Life-Threatening Behavior*. 1971;1:184-202.

[6] Kaplan MS, Huguet N, McFarland BH, Newsom JT. Suicide among male veterans: A prospective population-based study. *Journal of Epidemiology & Community Health*. 2007;61:619-624.

[7] Pollock DA, Rhodes P, Boyle CA, Decoufle P, McGee DL. Estimating the number of suicides among Vietnam veterans. *Am J Psychiatry*. 1990;147:772-776.

[8] Thompson R, Kane VR, Sayers SL, Brown GK, Coyne JC, Katz IR. An assessment of suicide in an urban VA medical center. *Psychiatry: Interpersonal and Biological Processes*. 2002;65:326-337.

[9] Zivin K, Kim HM, McCarthy JF, Austin KL, Hoggatt KJ, Walters H, Valenstein, M. Suicide mortality among individuals receiving treatment for depression in the Veterans Affairs health system: Associations with patient and treatment setting characteristics. *Am J Public Health.* 2007;97:2193-2198.

[10] Desai MM, Rosenheck RA, Desai RA. Time trends and predictors of suicide among mental health outpatients in the Department of Veterans Affairs. *J Behav Health Serv Res*. 2008;35:115-124.
[11] Drescher KD, Rosen CS, Burling TA, Foy DW. Causes of death among male veterans who received residential treatment for PTSD. *J Trauma Stress*. 2003;16:535-543.
[12] Thompson R, Katz IR, Kane VR, Sayers SL. Cause of death in veterans receiving general medical and mental health care. *J Nerv Ment Dis*. 2002;190:789-792.
[13] Hearst N, Newman TB. Proving cause and effect in traumatic stress: The draft lottery as a natural experiment. *J Trauma Stress*. 1988;1:173-180.
[14] Hearst N, Newman TB, Hulley SB. Delayed effects of the military draft on mortality: A randomized natural experiment. *N Engl J Med*. 1986;314:620-624.
[15] llgen MA, Tiet Q, Finney JW, Harris AH. Recent suicide attempt and the effectiveness of inpatient and outpatient substance use disorder treatment. *Alcoholism: Clinical and Experimental Research*. 2005;29:1664-1671.
[16] Lish JD, Zimmerman M, Farber NJ, Lush DT, Kuzma MA, Plescia G. Suicide screening in a primary care setting at a veterans affairs medical center. *Psychosomatics: Journal of Consultation Liaison Psychiatry*. 1996;37:413-424.
[17] Baumeister RF, Leary MR. The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychol Bull*. 1995;117:497-529.
[18] Trout DL. The role of social isolation in suicide. *Suicide Life Threat Behav*. 1980;10:10-23.
[19] Van Orden KA, Merrill KA, Joiner TE. Interpersonal-psychological precursors to suicidal behavior: A theory of attempted and completed suicide. *Current Psychiatry Reviews*. 2005;1:187-196.
[20] Brown MZ, Comtois KA, Linehan MM. Reasons for suicide attempts and nonsuicidal self-injury in women with borderline personality disorder. *J Abnorm Psychol*. 2002;111:198-202.
[21] de Catanzaro D. Reproductive status, family interactions, and suicidal ideation: Surveys of the general public and high-risk groups. *Ethology & Sociobiology*. 1995;16:385-394.
[22] Van Orden KA, Lynam ME, Hollar D, Joiner TE. Perceived Burdensomeness as an indicator of suicidal symptoms. *Cognitive Therapy and Research*. 2006;30:457-467.
[23] Joiner TE, Pettit JW, Walker RL, Voelz, ZR, Cruz J, Rudd MD, Lester D. Perceived burdensomeness and suicidality: Two studies on the suicide notes of those attempting and those completing suicide. *Journal of Social & Clinical Psychology*. 2002;21:531-545.
[24] Orbach I, Mikulincer M, King R, Cohen D, Stein D. Thresholds and tolerance of physical pain in suicidal and nonsuicidal adolescents. *J Consult Clin Psychol*. 1997;65:646-652.
[25] Van Orden KA, Witte TK, Gordon KH, Bender TW, Joiner TE. Suicidal desire and the capability for suicide: Tests of the interpersonal-psychological theory of suicidal behavior among adults. *J Consult Clin Psychol*. 2008;76:72-83.
[26] Brown RM, Dahlen E, Mills C, Rick J, Biblarz A. Evaluation of an evolutionary model of self-preservation and self-destruction. *Suicide Life Threat Behav*. 1999;29:58-71.
[27] Lambert MT, Fowler DR. Suicide risk factors among veterans: Risk management in the changing culture of the Department of Veterans Affairs. *Journal of Mental Health Administration*. 1997;24:350-358.

[28] Eastridge BJ, Jenkins D, Flaherty S, Schiller H, & Holcomb JH. Trauma system development in a theater of war: Experiences from Operation Iraqi Freedom and Operation Enduring Freedom. *J Trauma*, 2006, 61:1366-1373.

[29] Lincoln AE, Helmer DA, Schneiderman AI, Li M, Copeland HL, Prisco MK, Wallin MT, Kang HK, Natelson BH. The War-Related Illness and Injury Study Centers: A Resource for Deployment-Related Health Concerns. *Mil Med*. 2006;171:577-585.

[30] Tanielian T, Jaycox LH. *Invisible Wounds of War: Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery*. Santa Monica, CA: The RAND Center for Military Health Policy Research; 2008.

[31] Anderson KH, Mitchell JM. Effects of military experience on mental health problems and work behavior. *Med Care*. 1992;30:554-563

[32] Smith MW, Schnurr PP, Rosenheck RA, Salzer M. Employment Outcomes and PTSD Symptom Severity. *Ment Health Serv Res*. 2005;7:89-101.

[33] Zatzick D, Weiss DS, Marmar CR, Metzler TJ, Wells K, Golding JM, Stewart A, Schlenger WE, Browner WS. Post-traumatic stress disorder and functioning and quality of life outcomes in female Vietnam veterans. *Mil Med*. 1997;162:661-665.

[34] Freeman TW, Moore WM. A comparison of chronic combat-related posttraumatic stress disorder (PTSD) patients with and without a history of suicide attempt. *J Nerv Ment Dis*. 2000;188:460-463.

[35] Benda BB. Gender differences in predictors of suicidal thoughts and attempts among homeless veterans that abuse substances. *Suicide Life Threat Behav*. 2005;35:106-116.

[36] Brenner LA, Gutierrez PM, Cornette MM, Betthauser LM, Bahraini N, Staves PJ. A Qualitative study of potential suicide risk factors in returning combat veterans. *Journal of Mental Health Counseling*. 2008;30:211-225.

[37] Manguno-Mire G, Sautter F, Lyons J, Myers L, Perry D, Sherman M, Glynn S, Sullivan G. Psychological distress and burden among female partners of combat veterans with PTSD. *J Nerv Ment Dis*. 2007;195:144-151.

[38] Beckham JC, Lytle BL, Feldman M. Caregiver burden in partners of Vietnam War veterans with posttraumatic stress disorder. *J Consult Clin Psychol*. 1996;64:1068-1072.

[39] Calhoun PS, Beckham JC, Bosworth HB. Caregiver burden and psychological distress in partners of veterans with chronic posttraumatic stress disorder. *J Trauma Stress*. 2002;15:205-212.

[40] Bonner RL, Rich AR. Toward a predictive model of suicidal ideation and behavior: Some preliminary data in college students. *Suicide Life Threat Behav*. 1987;17:50-63.

[41] Dieserud G, Roysamb E, Ekeberg O, Kraft P. Toward an integrative model of suicide attempt: A cognitive psychological approach. *Suicide Life Threat Behav*. 2001;31:153-168.

[42] Koivumaa-Honkanen H, Honkanen R, Viinamäki H, Heikkilä K, Kaprio J, Koskenvuo M. Life satisfaction and suicide: A 20-year follow-up study. *Am J Psychiatry*. 2001;158:433-439.

[43] Roberts RK, Roberts CR, Chen YR. Suicidal thinking among adolescents with a history of attempted suicide. *J Am Acad Child Adolesc Psychiatry*. 1998;37:1294-1300.

[44] Stravynski A, Boyer R. Loneliness in relation to suicide ideation and parasuicide: A population-wide study. *Suicide Life Threat Behav*. 2001;31:32-40.

[45] Waern M, Rubenowitz E, Wilhelmson K. Predictors of Suicide in the Old Elderly. *Gerontology*. 2003;49:328-334.
[46] Joiner TE, Hollar D, Van Orden K. On Buckeyes, Gators, Super Bowl Sunday, and the Miracle on Ice: 'Pulling together' is associated with lower suicide rates. *Journal of Social & Clinical Psychology*. 2006;25:179-195.
[47] Biller OA. Suicide related to the assassination of President John F. Kennedy. *Suicide Life Threat Behav*. 1977;17:50-63.
[48] Joiner TE. Interpersonal aspects of depression and suicide. Presented at: American Psychological Association Annual Conference; 2000; Washington, D.C.
[49] Rojcewicz SJ. War and suicide. Life-Threatening Behavior. 1971;1:46-54.
[50] Mullis MR, Byers PH. Social support in suicidal patients. *J Psychosoc Nurs Ment Health Serv*. 1987;25:16-19.
[51] Ren XS, Skinner K, Lee A, Kazis L. Social support, social selection and self-assessed health status: Results from the veterans health study in the United States. *Soc Sci Med*. 1999;48:1721-1734.
[52] Marshall AD, Panuzio J, Taft CT. Intimate partner violence among military veterans and active duty servicemen. *Clin Psychol Rev*. 2005;25:862-876.
[53] Riggs DS, Byrne CA, Weathers FW, Litz BT. The quality of the intimate relationships of male Vietnam veterans: Problems associated with posttraumatic stress disorder. *J Trauma Stress*. 1998;11:87-101.
[54] Gimbel C, Booth A. Why does military combat experience adversely affect marital relations? *Journal of Marriage & the Family*. 1994;56:691-703.
[55] Nezu AM, Carnevale GJ. Interpersonal problem solving and coping reactions of Vietnam veterans with posttraumatic stress disorder. *J Abnorm Psychol*. 1987;96:155-157.
[56] Ruscio AM, Weathers FW, King LA, King DW. Male war-zone veterans' perceived relationships with their children: The importance of emotional numbing. *J Trauma Stress*. 2002;15:351-357.
[57] Samper RE, Taft CT, King DW, King LA. Posttraumatic stress disorder symptoms and parenting satisfaction among a national sample of male Vietnam veterans. *J Trauma Stress*. 2004;17:311-315.
[58] Hiley-Young B, Blake DD, Abueg FR, Rozynko V, Gusman FD. Warzone violence in Vietnam: An examination of premilitary, military, and postmilitary factors in PTSD in-patients. *J Trauma Stress*. 1995;8:125-141.
[59] Beckham JC, Feldman ME, Kirby AC. Atrocities exposure in Vietnam combat veterans with chronic posttraumatic stress disorder: Relationship to combat exposure, symptom severity, guilt and interpersonal violence. *J Trauma Stress*. 1998;11:777-785.
[60] Nock MK, Kaufman J, Rosenheck RA. Examination of predictors of severe violence in combat-exposed Vietnam veterans. *J Trauma Stress*. 2001;14:835-841.
[61] Fontana A, Rosenheck R. An etiological model of attempted suicide among Vietnam theater veterans: Prospective generalization to a treatment-seeking sample. *J Nerv Ment Dis*. 1995;183:377-383.
[62] Bullman TA, Kang HK. The risk of suicide among wounded Vietnam veterans. *Am J Public Health*. 1996;86:662-667.

[63] Butterfield MI, Stechuchak KM, Connor KM, Davidson JR, Wang C, MacKuen CL, Pearlstein AM, Marx CE. Neuroactive Steroids and Suicidality in Posttraumatic Stress Disorder. *Am J Psychiatry*. 2005;162:380-382.

[64] Kramer TL, Lindy JD, Green BL, Grace MC, Leonard AC. The comorbidity of post-traumatic stress disorder and suicidality in Vietnam veterans. *Suicide Life Threat Behav*. 1994;24:58-67.

[65] Hendin H, Haas AP. Suicide and guilt as manifestations of PTSD in Vietnam combat veterans. *Am J Psychiatry*. 1991;148:586-591.

[66] Bell JB, Nye EC. Specific symptoms predict suicidal ideation in Vietnam combat veterans with chronic post-traumatic stress disorder. *Mil Med*. 2007;172:1144-1147.

[67] Begic D, Jokic-Begic N. Aggressive behavior in combat veterans with post-traumatic stress disorder. *Mil Med*. 2001;166:671-676.

[68] Freeman TW, Roca V. Gun use, attitudes toward violence, and aggression among combat veterans with chronic posttraumatic stress disorder. *J Nerv Ment Dis*. 2001;189:317-320.

[69] Stellrecht NE, Gordon KH, Van Orden K, Witte TK, Wingate LR, Cukrowicz KC, Butler M, Schmidt NB, Fitzpatrick KK, Joiner TE. Clinical applications of the interpersonal-psychological theory of attempted and completed suicide. *J Clin Psychol*. 2006;62:211-222.

[70] Martell CR, Addis ME, Jacobson NS. *Depression in context: Strategies for guided action*. New York: W.W. Norton & Company; 2001.

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 19

THE CONCEPT OF POSTTRAUMATIC MOOD DISORDER AND ITS RELATION TO SUICIDAL BEHAVIOR IN WAR VETERANS

Leo Sher
Columbia University and New York State Psychiatric Institute,
New York, New York, USA

ABSTRACT

Individuals exposed to severe traumatic stress often develop comorbid posttraumatic stress disorder (PTSD) and major depressive disorder (MDD). I developed a new concept suggesting that that some or all individuals diagnosed with comorbid PTSD and MDD have a separate psychobiological condition that can be termed "post-traumatic mood disorder" (PTMD). This concept is supported by a significant number of clinical, translational and other studies suggesting that patients suffering from comorbid PTSD and MDD are different clinically and biologically from individuals with PTSD alone or MDD alone. Patients with comorbid PTSD and MDD are characterized by greater impairment compared to individuals with PTSD alone or MDD alone. Neurobiological evidence supporting the concept of PTMD includes the findings related to dopaminergic, serotonergic, and hypothalamic-pituitary-adrenal axis function and other observations. Combat-related trauma may result in PTMD. The wars in Iraq and Afghanistan have presented coalition soldiers with a unique set of severe and chronic stressors. Many returning war veterans suffer from comorbid PTSD and MDD (i.e., PTMD) and exhibit suicidal behavior. Both PTSD and MDD are associated with suicidal behavior and there are observations suggesting that individuals with comorbid PTSD and MDD (i.e., PTMD) have higher suicidality compard to persons with MDD only. It is crucial to develop interventions to prevent and to treat PTMD in war veterans and measures to prevent and to treat suicidal ideation and behavior in war veterans with PTMD.

POSTTRAUMATIC STRESS DISORDER

Since its official recognition as a psychiatric diagnosis nearly 30 years ago, there has been remarkable progress in understanding post-traumatic stress disorder (PTSD) and developing and testing evidence-based treatments. PTSD is a common and severe psychiatric disorder precipitated by exposure to a psychologically distressing event. PTSD first appeared in the Diagnostic and Statistical Manual of Psychiatric Disorders (DSM-III) in 1980 (1,2), arising from studies of the Vietnam war, and of civilian victims of natural and man-made disasters (3,4). However, the study of PTSD dates back more than 100 years. Before 1980, post-traumatic syndromes were recognized by different names, including railway spine, shell shock, traumatic (war) neurosis, concentration-camp syndrome, and rape-trauma syndrome (2,3). The symptoms described in these syndromes overlap considerably with what we now recognize as PTSD. According to the most recent edition of the Diagnostic and Statistical Manual of Psychiatric Disorders (DSM-IV-TR) (5), the essential feature of PTSD is the development of characteristic symptoms following exposure to an extreme traumatic stressor characterized by: direct personal experience of an event that involves actual or threatened death or serious injury, or other threat to one's physical integrity; or witnessing an event that involves death, injury, or a threat to the physical integrity of another person; or learning about unexpected or violent death, serious harm, or threat of death or injury experienced by a family member or other close associate. The person reacts to this event with fear and helplessness, and tries to avoid being reminded of it.

PTSD holds an important place in psychiatric thinking for several reasons. First it is one of the few disorders (besides disorders induced by substances or general medical conditions) in which an etiology is specified, despite the effort of DSM-IV to be atheoretical. As a consequence it has become a paradigm for understanding the role of the environment in psychopathology. Throughout the history of the concept of PTSD there has been a tension between an emphasis on factors relating to the host and factors relating to the nature of the trauma in the understanding of the etiology of this disorder.

PTSD is characterized by the presence of three distinct, but co-occurring, symptom clusters (2,5). *Reexperiencing symptoms* describe spontaneous, often insuppressible intrusions of the traumatic memory in the form of images or nightmares that are accompanied by intense physiological distress. *Avoidance symptoms* involve restricting thoughts and distancing oneself from reminders of the event, as well as more generalized emotional and social withdrawal. *Hyperarousal symptoms* reflect more overt physiological manifestations, such as insomnia, irritability, impaired concentration, hypervigilance, and increased startle responses. These symptoms must be severe enough to impair social, occupational, or interpersonal function and co-occur for at least 1 month. The impairment from PTSD is amplified by poor coping strategies, substance abuse, co-occurring mood and anxiety disorders, lack of social support, and the accelerated development of stress-related medical conditions. A large body of research indicates that there is a correlation between PTSD and suicide (2,5). There is evidence that traumatic events such as sexual abuse, combat trauma, rape, and domestic violence generally increase a person's suicide risk.

PTSD is a disorder of forgetting perhaps even more than of remembering (6,7). It is the inability to forget the trauma that leads to the pathology and suffering in PTSD. Forgetting is a critical component of recovery. Of course, if we could not forget, our brains would rapidly

be cluttered with information and observations and perhaps more limited in cognitive control functions for other activities.

Much of the early research on PTSD was based on the assumption that PTSD is a natural consequence of trauma exposure (2-6). However, a growing body of research suggests that many persons exposed to traumatic events do not develop PTSD, or they recover quickly from stress symptomatology experienced in the immediate aftermath of trauma exposure. Although most people (50-90%) encounter trauma over a lifetime, only about 8% develop full PTSD. Vulnerability to PTSD presumably stems from an interaction of biological diathesis, early childhood developmental experiences, and trauma severity. Predictor models have consistently found that childhood trauma, chronic adversity, and familial stressors increase risk for PTSD as well as risk for biological markers of risk for PTSD after a traumatic event in adulthood. This effect of childhood trauma, which is not well understood, may be a marker for both traumatic experiences and attachment problems.

War, terrorism, and natural disasters create large populations in distress (6). Not all distress amounts to mental disorder, but fear, worry, insomnia, and changes in health-risk behaviors all contribute to the health burden of mass violence and are targets for early public health intervention. Substantial evidence supports essential principles of immediate and midterm mass trauma interventions that are now described as psychological first aid (8).

About 30 armed conflicts are occurring now around the globe involving more than 25 countries (9,10). For those in the United States and the United Kingdom, Iraq and Afghanistan are the present teachers of lessons long known and too often forgotten. Epidemiological surveys conducted during the current conflicts in Iraq and Afghanistan suggest that as many as 13% to 17% of service members screen positive for PTSD (11).

It is important to note that one of the most serious consequences of PTSD is its association with the heavy use of alcohol and/or other drugs (2-6). Substance abuse has immediate consequences in the form of increased accidents, injuries, and long-term effects in terms of occupational and familial instability and early mortality. Furthermore, substance abuse, in itself, is often a risk factor for additional traumatic exposures either through accidents or interpersonal violence. The use of alcohol and/or other drugs is associated with suicidal and homicidal behavior. Impulsivity in combination with a mood disorder or PTSD increases the risk of suicidal behavior. Individuals exposed to severe traumatic stress often develop comorbid PTSD and major depressive disorder (MDD).

MAJOR DEPRESSIVE DISORDER

MDD is a significant public health problem (3,5). MDD is relatively common and its recurrent nature profoundly disrupts patients' lives. MDD afflicts one in eight Americans during their lifetimes and costs the U.S. economy more than $80 billion annually in medical treatment and lost productivity (12). Many people suffer from dysthymia which is a milder form of depression than MDD. About 10-15% of patients with MDD die from suicide (3). Overall, patients with MDD die at a younger age, especially from cardiovascular disease, than the general population. They show substantial impairment on numerous measures of social functioning, including measures of marital and occupational functioning. MDD is associated with high rates of alcohol and drug abuse, which may be a form of self-medication. About

25% of patients with MDD abuse alcohol or illegal drugs, percentages that are far higher than the general population rate of 8% (3,5). The rate of occupational, social, and physical disabilities of patients with mood disorders is equal to or greater than that for patients with other major chronic illnesses, including hypertension, diabetes, coronary artery disease, lung disease, gastrointestinal disease, and arthritis. Patients with MDD become medically ill more often and show greater physical disability and sometimes higher death rates when ill (3). The DSM-IV criteria for major depression stipulate that a patient has a persistent, distinct feeling of depression and/or loss of pleasure or interest in usual activities that lasts for at least two weeks (5). In order to complete the diagnosis, at least four associated symptoms must also be present (decrease or increase in appetite, insomnia or hypersomnia, loss of energy, psychomotor agitation or retardation, feelings of worthlessnessin or appropriate guilt, diminished ability to concentrate or indecisiveness, and recurrent thoughts of death or suicidal behavior). It is worth noting that patients with MDD and/or PTSD often feel sad because they experience a personal sense of guilt or inadequacy. Cognitive dysfunction is another way in which patients are affected by PTSD and/or MDD (2-6).

THE CONCEPT OF POST-TRAUMATIC MOOD DISORDER

PTSD and major depression are frequently comorbid (13-15). Brown and colleagues (14) assessed lifetime anxiety and mood disorders comorbidity in a community sample of outpatients and found that PTSD was the anxiety disorder most likely to be associated with MDD, with 69% of individuals with PTSD also meeting criteria for MDD. Findings from the National Comorbidity Survey indicated that 78% of individuals meeting criteria for both disorders reported that their PTSD preceded the MDD (15).

Many research groups reported that individuals with comorbid PTSD and MDD were characterized by greater severity of symptoms and the higher level of impairment in social and occupational functioning compared to individuals with PTSD alone (13,16-23). One study found that comorbidity of PTSD and MDD was associated with more severe symptoms as well as higher levels of disability on all indices (global dysfunction, distress, social impairment, and occupational disability) (23). Another research group observed that a severity of overall symptoms was three- to fivefold greater in subjects with comorbid PTSD and MDD compared to those with PTSD alone (18). A study of military veterans found that adjusting for sociodemographic differences and physical illness comorbidity, patients with comorbid PTSD and MDD reported more severe depression, lower social support, more frequent outpatient health care visits, and were more likely to report suicidal ideation than MDD patients (13). A large-scale epidemiological survey found that the comorbid group was five times more likely to manifest functional impairment compared to those diagnosed with PTSD alone (16). A recent study reported that patients with comorbid PTSD and MDD had higher objective MDD, impulsivity, and hostility scores and were significantly more likely to have made a suicide attempt compared to subjects with MDD alone (24). We found that depressed subjects with comorbid PTSD tended towards earlier age of first hospitalization and a higher number of hospitalizations compared to depressed individuals without comorbid PTSD (25).

Maes et al. (26) reported that there is an association between PTSD with concurrent major MDD and lower affinity of alpha-2 adrenoreceptors, as well as higher plasma tyrosine availability to the brain, not found in patients suffering from PTSD alone. Woodward et al. (27) found that patients with comorbid PTSD and MDD exhibited less slow wave sleep and less facial (mentalis) electromyographic activity, compared with PTSD patients without comorbid MDD. Patients with comorbid PTSD and MDD did not exhibit the classic rapid eye movement sleep architectural modifications associated with unipolar depression, despite the fact that several other psychophysiological indices of dysphoria were detectable in their sleep.

Cortisol response to placebo or fenfluramine was examined in depressed patients with or without comorbid PTSD and in a control group of healthy volunteers (28). Depressed patients with comorbid PTSD had the lowest plasma cortisol; depressed patients without comorbid PTSD had the highest plasma cortisol; and healthy volunteers had intermediate levels. This suggests differences in hypothalamic-pituitary-adrenal axis function among these three groups. We compared the effect of age on cortisol levels in depressed patients with or without comorbid PTSD and in healthy volunteers (29,30). We found that cortisol levels increased with age in depressed patients with PTSD alone; they did not increase in depressed patients with comorbid PTSD or in healthy volunteers. We also observed that the number of previous major depressive episodes was a predictor of the cortisol response to fenfluramine administration in depressed patients without PTSD, but not in depressed patients with comorbid PTSD. We also found that depressed subjects with comorbid PTSD had higher cerebrospinal fluid (CSF) homovanillic acid (HVA) levels compared with depressed subjects without comorbid PTSD or healthy volunteers (25). The dexamethasone suppression-corticotrophin releasing hormone (DEX-CRH) test has shown to be a more sensitive test to assess HPA-axis dysregulation in MDD and therefore may provide a useful test tool to probe HPA-axis regulation in MDD and PTSD (35,36). To evaluate the effect of PTSD on HPA-axis regulation, the response to a DEX-CRH test between male veterans with PTSD and male veterans, who had been exposed to similar traumatic events during their deployment, without PTSD was compared (37). The DEX-CRH test did not reveal HPA-axis abnormalities in PTSD patients as compared to trauma controls. PTSD patients with a co-morbid MDD showed an attenuated ACTH response compared to PTSD patients without co-morbid MDD, suggesting the presence of subgroups with different HPA-axis regulation within the PTSD group. Altered sensitivity of the CRH receptors at the pituitary or differences in AVP secretion might explain these differences in response.

Davidson et al. (31) observed genetic shared liability for PTSD and MDD, with familial loading for MDD predicting chronic PTSD in trauma survivors was found. Koenen et al. (32) analyzed data from about 7,000 members of the Vietnam Era Twin Registry and found substantial genetic overlap between PTSD and MDD and suggested that genes implicated in the etiology of MDD are strong candidates for PTSD and vice versa.

Subjects with PTSD without comorbid MDD and patients with PTSD with comorbid MDD were examined using the script-driven symptom-provocation paradigm adapted to functional magnetic resonance imaging (33). This study found different patterns of brain activation in subjects with PTSD without comorbid MDD compared to patients with PTSD with comorbid MDD. PTSD patients with comorbid MDD relative to both healthy controls and trauma-exposed control subject showed reduced norepinephrine transporter expression in the left thalamus (34). PTSD patients without comorbid MDD did not show differences in norepinephrine transporter expression relative to healthy controls and trauma-exposed control

subject, i.e., PTSD patients showed reduced left thalamic norepinephrine transporter expression only when having comorbid MDD.

In summary, clinical and neurobiological evidence strongly suggests that patients suffering from comorbid PTSD and MDD differ clinically and biologically from individuals with PTSD alone or MDD alone. I have previously suggested that some or all individuals diagnosed with comorbid PTSD and MDD have a separate psychobiological condition that can be termed "post-traumatic mood disorder" (PTMD) (38,39).

SUICIDAL BEHAVIOR IN PTMD

Suicidal act refers to the occurrence of suicide attempts, which can be defined as self-directed injurious acts with at least some intent to end one's own life (3,40). Suicidal behavior ranges from fatal acts (completed suicide), to highly lethal and failed suicide attempts (where high intention and planning are evident, and survival is fortuitous), and to low-lethality attempts (usually impulsive attempts that are triggered by a social crisis). Multiple risk factors are associated with suicidal behavior, which has been conceptualized as the outcome of the interaction between an individual's diathesis for suicidal acts and triggers for suicidal behavior. The diathesis refers to the propensity for manifesting suicidal behavior and may be considered trait-related and independent of psychiatric diagnosis. In contrast, triggers are precipitants or stressors that determine the timing and probability of suicidal acts. Thus, triggers may be considered state-related. In this regard, risk factors for suicidal behavior may be categorized according to whether they affect the diathesis or the triggers. Both PTSD and MDD are associated with suicidal behavior and there are observations suggesting that individuals with comorbid PTSD and MDD (i.e., PTMD) have higher suicidality compared to persons with MDD only (3,38-40).

Multiple neurobiological factors including serotonin, glutamate, gamma-aminobutyric acid, norepinephrine, neuropeptide Y, corticotrophin-releasing hormone, dopamine, opioids, and thyroid hormones are involved in the pathophysiology of PTSD which is enormously complex (2-4,6,38,39). Some neurobiological alterations observed in PTSD may be related to suicidal behavior. Serotonergic and hypothalamic-pituitary adrenal (HPA) axis abnormalities are associated with both PTSD and suicidal behavior and may underlie both conditions.

THE CONCEPT OF PTMD AND SUICIDAL BEHAVIOR IN WAR VETERANS

Since October 2001, approximately 1.64 million U.S. troops have been deployed for Operations Enduring Freedom and Iraqi Freedom (OEF/OIF) in Afghanistan and Iraq (41). The war in Iraq has presented Soldiers and Marines with a unique set of stressors that are chronic in nature, including civilian threats such as guerilla warfare tactics and terrorist actions (11,41). Soldiers and Marines need to maintain constant vigilance to deal with unpredictable threats like roadside bombs, and to discern safe civilians from potential enemy combatants (42). Military personnel involved in the OEF face similar problems in Afghanistan.

Early evidence suggests that the psychological toll of these deployments—many involving prolonged exposure to combat-related stress over multiple rotations—may be disproportionately high compared with the physical injuries of combat (41). In the face of mounting public concern over post-deployment health care issues confronting OEF/OIF veterans, several task forces, independent review groups, and a President's Commission have been convened to examine the care of the war wounded and make recommendations. The challenge of identifying veterans or active duty military who are suffering from PTSD, MDD, and/or those at risk for suicide has been receiving high-profile attention within the military and the Department of Veterans Affairs, as well as on Capitol Hill. Concerns have been most recently centered on two combat-related injuries in particular: posttraumatic stress disorder and traumatic brain injury (43-45). Many recent reports have referred to these as the signature wounds of the Afghanistan and Iraq conflicts. With the increasing incidence of suicide and suicide attempts among returning veterans, concern about depression is also on the rise. It has been estimated that nearly 20% of members of the military service (about 300,000 individuals) who have returned from Iraq and Afghanistan report symptoms of PTSD or MDD.

Suicide remains a difficult issue to study, whether in a civilian or military context. The exigencies of warfare, however, demand the selection and training of young men (and women in many countries) to commit controlled violence in a rational, emotionally-detached manner.

The risk of suicide attempts among the PTSD population is six times greater than in the general population (46,47) and even higher among treatment seeking war veterans with PTSD (48). In fact, war veterans are two times more likely to die of suicide than are nonveterans (49). Considering these statistics, it is possible that many soldiers returning from Iraq and Afghanistan may at some time experience suicidal ideation or make a suicide attempt.

The comorbidity of one or more disorders with PTSD significantly impacts the likelihood that veterans may choose suicidal behavior as an avenue for relief (50,51). As noted above, persons with PTSD and comorbid MDD are at a high risk for suicidal behavior (13,38,39,52-54). Comorbidity of PTSD and MDD is associated with increased illness burden, poorer prognosis, and delayed response to depression treatment (38). In one study, veterans were assessed for suicidal thinking and behaviors, and symptoms of PTSD and depression (51). Thoughts of ending one's life and a previous suicide attempt were significantly correlated with a diagnosis of PTSD. Veterans with a diagnosis of PTSD and MDD or dysthymia were also more likely to report suicidal thinking and behaviors than veterans with only one of the diagnoses.

I have recently proposed a model of suicidal behavior in war veterans with PTMD (55). The model consists of the following components: 1) genetic factors; 2) prenatal development; 3) biological and psychosocial influences from birth to mobilization/deployment; 4) mobilization/pre-deployment stress; 5) combat stress, traumatic brain injury, and physical injury; 6) post-deployment stress; 7) biological and psychosocial influences after the deployment; 8) trigger (precipitant) of a suicidal act; and 9) suicidal act. The first four components determine vulnerability to combat stress. The first seven components determine predisposition to suicidal behavior, a key element that differentiates PTMD patients who are at high risk from those at lower risk. Suicidal behavior in PTMD can be attributed to the coincidence of a trigger with a predisposition for suicidal behavior.

Most likely, precipitants of suicidal acts in war veterans include interpersonal losses or conflicts, financial trouble, and job problems. Symptoms such as melancholia, insomnia, psychosis, extreme hopelessness, mixed or transitional bipolar states, alcohol and substance abuse, marked impulsivity, a poor response to medication, definite plans for committing suicide, a history of prior attempts, and a family history of suicide increase suicide risk in war veterans.

Treating suicidal ideation is important because suicidal ideation is one of the main predictors of suicidal acts (56-61). Suicidal ideation in war veterans may lead to suicide or a highly lethal suicide attempt because war veterans know how to use firearms. Therefore, treating suicidal ideation is key in preventing suicide among war veterans. Both psychological and pharmacological treatments can be used to treat suicidal ideation. More studies are needed to develop new treatments for suicidal ideation in individuals with PTMD. It is also important to treat other symptoms of PTMD that may be associated with suicidal behavior, e.g., insomnia.

Medications affecting the serotonergic system may reduce symptoms of PTMD, treat comorbid conditions, such as substance abuse, and reduce suicidality. Medications affecting the HPA system may potentially have a beneficial effect on individuals with PTMD and suicidal behavior.

CONCLUSION

PTSD, MDD, and PTMD are neither normal variations in mood nor appropriate reactions to severe stress. These disorders are distinguished from normal reactions by the duration and intensity of the patient's suffering and the degree of his or her functional impairment. It is also crucial for physicians, and the general public, to realize that these disorders do not represent a failure of "will power" or some other form of moral weakness.

Combat-related mental health pathology is a critical medical and social problem. It is crucial to develop interventions to prevent and to treat PTMD in war veterans and measures to prevent and to treat suicidal ideation and behavior in war veterans with PTMD. Priorities for intervening to reduce suicidal behavior in war veterans lie with interventions focused upon the improved recognition, treatment and management of veterans with PTSD, MDD or PTMD.

REFERENCES

[1] American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. Third Edition. Washington, DC, American Psychiatric Association, 1980: 236–238.

[2] Schnurr PP, Friedman MJ, Bernardy NC. Research on posttraumatic stress disorder: epidemiology, pathophysiology, and assessment. *J Clin Psychol* 2002; 58: 877–889.

[3] Cutler JL, Marcus ER (editors). *Psychiatry*. Philadelphia, WB Saunders, 1999.

[4] Hageman I, Andersen HS, Jorgensen MB. Post-traumatic stress disorder: a review of psychobiology and pharmacotherapy. *Acta Psychiatr Scand* 2001; 104: 411–422.

[5] American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, Text Revision. Washington DC, American Psychiatric Association, 2000: 463–468.

[6] Ursano RJ, Benedek DM, Fullerton CS. Posttraumatic Stress Disorder: Neurobiology, Psychology, and Public Health. Psychiatric Times, 2008; 25(3). *http://www.consultantlive.com/pathologic-processes/article/10168/1147506?pageNumber=2* Accessed August 7, 2008

[7] Kuhl BA, Dudukovic NM, Kahn I, Wagner AD. Decreased demands on cognitive control reveal the neural processing benefits of forgetting. *Nat Neurosci* 2007;10:908-914.

[8] Hobfoll SE, Watson P, Bell CC, et al. Five essential elements of immediate and mid-term mass trauma intervention: empirical evidence. *Psychiatry* 2007;70: 283-315.

[9] Project Plowshares Armed Conflicts Report 2007 Summary. Available at: *http://www.ploughshares.ca/ libraries/ACRText/Summary2006.pdf.* Accessed August 5, 2008.

[10] *http://www.globalsecurity.org/military/world/war/index.html* Accessed August 8, 2008

[11] Hoge CW, Castro CA, Messer SC, et al. Combat duty in Iraq and Afghanistan, mental health problems and barriers to care. *N Engl J Med* 2004;351:13-22.

[12] Greenberg PE, Kessler RC, Birnbaum HG, Leong SA, Lowe SW, Berglund PA, Corey-Lisle PK. The economic burden of depression in the United States: how did it change between 1990 and 2000? *J Clin Psychiatry* 2003;64(12):1465-75.

[13] Campbell DG, Felker BL, Chuan-Fen L et al. Prevalence of PTSD-Depression comorbidity: Implications for clinical practice guidelines and primary care interventions. *J Gen Intern Med* 2007;22:711-8.

[14] Brown TA, Campbell LA, Lehman CL, Grisham JR, Mancill RB. Current and lifetime comorbidity of the DSM-IV anxiety and mood disorders in a large clinical sample. *J Abnorm Psychol* 2001; 110: 585-599.

[15] Kessler RC, Sonnega A, Bromet E, Hughes M, Nelson CB. Posttraumatic stress disorder in the National Comorbidity Survey. *Arch Gen Psychiatry* 1995; 52: 1048-1060.

[16] Mollica RF, McInnes K, Sarajlic N, Lavelle J, Sarajlic I, Massagli MP. Disability associated with psychiatric comorbidity and health status in Bosnian refugees living in Croatia. *J Am Med Assoc* 1999; 282: 433-439.

[17] Shalev AY, Freedman S, Peri T, Brandes D, Sahar T, Orr SP, Pitman RK. Prospective study of posttraumatic stress disorder and depression following trauma. *Am J Psychiatry*. 1998; 155: 630-637.

[18] Karam EG. *Comorbidity of posttraumatic stress disorder and depression.* In: Fullerton C, Ursano RJ (editors). Posttraumatic Stress Disorder: Acute and Long-Term Responses to Traumas and Disaster. Progress in Psychiatry Series, No. 51. American Psychiatric Press, Washington, DC, 1997; pp. 77-90.

[19] Moore LJ, Boehnlein JK. Posttraumatic stress disorder, depression, and somatic symptoms in U.S. Mien patients. *J Nerv Ment Dis* 1991; 179: 728-733.

[20] Skodol AE, Schwartz S, Dohrenwend BP, Levav I, Shrout PE, Reiff M. PTSD symptoms and comorbid mental disorders in Israeli war veterans. *Br J Psychiatry*. 1996; 169: 717-725.

[21] Koren D, Arnon I, Klein E. Acute stress response and posttraumatic stress disorder in traffic accident victims: a one-year prospective, follow-up study. *Am J Psychiatry*. 1999; 156: 367-373.

[22] Mintz J, Mintz LI, Arruda MJ, Hwang SS. Treatments of depression and the functional capacity to work. *Arch Gen Psychiatry* 1992; 49:761-768.

[23] Momartin S, Silove D, Manicavasagar V, Steel Z. Comorbidity of PTSD and depression: association with trauma exposure, symptom severity and functional impairment in Bosnian refugees resettled in Australia. *J Affect Disord* 2004; 80: 231–248.

[24] Oquendo M, Brent DA, Birmaher B, Greenhill L, Kolko D, Stanley B, Zelazny J, Burke AK, Firinciogullari S, Ellis SP, Mann JJ. Posttraumatic stress disorder comorbid with major depression: factors mediating the association with suicidal behavior. *Am J Psychiatry* 2005; 62: 560-566.

[25] Sher L, Oquendo MA, Li S, Burke AK, Grunebaum MF, Zalsman G, Huang YY, Mann JJ. Higher cerebrospinal fluid homovanillic acid levels in depressed patients with comorbid post-traumatic stress disorder. *Eur Neuropsychopharmacol* 2005; 15: 203-209.

[26] Maes M, Lin AH, Verkerk R, Delmeire L, Van Gastel A, Van der Planken M, Scharpe S. Serotonergic and noradrenergic markers of post-traumatic stress disorder with and without major depression. *Neuropsychopharmacology* 1999; 20: 188–197.

[27] Woodward SH, Friedman MJ, Bliwise DL. Sleep and depression in combat-related PTSD inpatients. *Biol Psychiatry* 1996; 39: 182–192.

[28] Oquendo MA, Echavarria G, Galfalvy HC, Grunebaum MF, Burke A, Barrera A, and others. Lower cortisol levels in depressed patients with comorbid post-traumatic stress disorder. *Neuropsychopharmacology* 2003; 28: 591– 598.

[29] Sher L, Oquendo MA, Galfalvy HC, Cooper TB, Mann JJ. Age effects on cortisol levels in depressed patients with and without a history of post-traumatic stress disorder, and healthy volunteers. *J Affect Disord 2*004; 82: 53-59.

[30] Sher L, Oquendo MA, Galfalvy HC, Cooper TB, Mann JJ. The number of previous depressive episodes is positively associated with cortisol response to fenfluramine administration. In: Yehuda R, McEwen B (editors). *Biobehavioral Stress Response:* Protective and Damaging Effects. Ann N Y Acad Sci 2004; 1032: 283-286.

[31] Davidson JR, Tupler LA, Wilson WH, Connor KM. A family study of chronic post-traumatic stress disorder following rape trauma. *J Psychiatr Res* 1998; 32: 301–309.

[32] Koenen KC, Fu QJ, Ertel K, Lyons MJ, Eisen SA, True WR, Goldberg J, Tsuang MT. Common genetic liability to major depression and posttraumatic stress disorder in men. *J Affect Disord* 2008;105(1-3):109-15.

[33] Lanius RA, Frewen PA, Girotti M, Neufeld RW, Stevens TK, Densmore M Neural correlates of trauma script-imagery in posttraumatic stress disorder with and without comorbid major depression: a functional MRI investigation. *Psychiatry Res.* 2007;155(1):45-56.

[34] Czermak C, Ding Y, Henry S, B.Planeta-Wilson B, S.Kasserman S, J.Frost J, W.Williams W, J.Krystal J, R.Carson R, A.Neumeister *A. Norepinephrine transporter imaging in posttraumatic stress disorder*. In: 46th Annual Meeting of the American College of Neuropsychopharmacology, Boca Raton, Florida, December 9-13, 2007. Abstracts. Program No. 133.

[35] Sher L, Cooper TB, Mann JJ, Oquendo MA. Modified dexamethasone suppression – corticotropin-releasing hormone stimulation test: a pilot study of young healthy volunteers and implications for alcoholism research in adolescents and young adults. Int *J Adolesc Med Health* 2006;18(1):133-137.

[36] Ising M, Kunzel HE, Binder EB, Nickel T, Modell S, Holsboer F. The combined dexamethasone/CRH test as a potential surrogate marker in depression. *Prog Neuropsychopharmacol Biol Psychiatry*. 2005;29(6):1085-93.

[37] de Kloet C, Vermetten E, Lentjes E, Geuze E, van Pelt J, Manuel R, Heijnen C, Westenberg H. Differences in the response to the combined DEX-CRH test between PTSD patients with and without co-morbid depressive disorder. *Psychoneuroendocrinology* 2008;33(3):313-20.

[38] Sher L. The concept of post-traumatic mood disorder. *Med Hypotheses* 2005;65(2):205-10.

[39] Sher L. Posttraumatic mood disorder: a new concept. *Can J Psychiatry* 2005;50(2):127-8.

[40] Carballo JJ, Akamnonu CP, Oquendo MA. Neurobiology of suicidal behavior. An integration of biological and clinical findings. *Arch Suicide Res*. 2008;12(2):93-110.

[41] Tanielian T, Jaycox LH, et al. Invisible Wounds of War. Psychological and Cognitive Injuries, *Their Consequences, and Services to Assist Recovery*. Santa Monica, CA.: RAND Corporation, 2008.

[42] Litz BT. *A brief primer on the mental health impact of the war in Irak and Afganistan.* A National Center for PTSD fact sheet. Boston.: National Center for PTSD; 2005.

[43] Friedman MJ. Acknowledging the psychiatric cost of war. *N Engl J Med* 2004;351(1):75-7.

[44] Hebert B. *Wounds You Can't See.* The New York Times. 2008, Jun 24.

[45] Asnis GM, Kohn SR, Henderson M, Brown NL. SSRIs versus non-SSRI's in posttraumatic stress disorder: an update with recommendations. *Drugs* 2004;64(4):383-404.

[46] Kessler RC. Posttraumatic stress disorder: the burden to the individual and to society. *J Clin Psychiatry* 2000;61(Suppl 5):4-12.

[47] Zivin K, Kim HM, McCarthy JF et al. Suicide mortality among individuals receiving treatment for depression in the Veterans Affairs health system: associations with patient and treatment setting characteristics. *Am J Public Health* 2007;97(12):2193-8.

[48] Tarrier N, Gregg L. Suicide risk in civilian PTSD patients. Predictors of suicidal ideation, planning and attempts. *Soc Psychiatry Psychiatr Epidemiol* 2004;39:655-661.

[49] Shaley AY, Freeman S, Peri T, et al. Prospective study of posttraumatic stress disorder and depression following trauma. *Am J Psychiatry* 1998;155:630-7.

[50] Keane TM, Wolfe J. Comorbidity in post-traumatic stress disorder: an analysis of community and clinical studies. *J Applied Social Psychology* 1990;20:1776-88.

[51] Kramer TL, Lindy JD, Green BL, Grace MC, Leonard AC. The comorbidity of post-traumatic stress disorder and suicidality in Vietnam veterans. *Suicide Life Threat Behav* 1994;24(1):58-67.

[52] Oquendo M, Brent DA, Birmaher B et al. Posttraumatic stress disorder comorbid with major depression: factors mediating the association with suicidal behavior. *Am J Psychiatry* 2005;162(3):560-6.

[53] Oquendo MA, Friend JM, Halberstan B et al. Association of comorbid posttraumatic stress disorder and major depression with greater risk for suicidal behavior. *Am J Psychiatry* 2003;160:580-582.
[54] Sher L. *The concept of post-traumatic mood disorder and its implications for adolescent suicidal behavior.* Minerva Pediatr, in press.
[55] Sher L. A model of suicidal behavior in war veterans with posttraumatic mood disorder. *Med Hypotheses*, in press.
[56] Beck AT, Brown GK, Steer RA, Dahlsgaard KK, Grisham JR. Suicidal ideation as its worst point: a predictor of eventual suicide in psychiatric outpatients. *Suicide Life Threat Behav* 1999;29:1-9.
[57] Bulik CM, Carpenter LL, Kupfer DJ, Frank E. Features associated with suicide attempts in recurrent major depression. *J Affect Disord* 1990;18(1):29-37.
[58] Drake RE, Gates C, Cotton PG, Whitaker A. Suicide among schizophrenics. Who is at risk? *J Nerv Ment Dis* 1984;172(10):613-7.
[59] Oquendo MA, Galfalvy H, Russo S et al. Prospective study of clinical predictors of suicidal acts after a major depressive episode in patients with major depressive disorder or bipolar disorder. *Am J Psychiatry* 2004;161(8):1433-41.
[60] Mann JJ, Ellis SP, Waternaux CM et al. Classification trees distinguish suicide attempters in major psychiatric disorders: a model of clinical decision making. *J Clin Psychiatry* 2008;69(1):23-31.
[61] Galvafy HC, Oquendo MA, Mann JJ. Evaluation of clinical prognostic models for suicide attempts after a major depressive episode. *Acta Psych Scand* 2008;117(4):244-52.

In: War and Suicide
Editors: Leo Sher and Alexander Vilens
ISBN: 978-1-60741-978-5
©2009 Nova Science Publishers, Inc.

Chapter 20

LOCATING NOW: ON HISTORICAL TRAUMA AND THE CONFUSION OF IDENTITY

Shelly Ben David
Columbia University and New York State Psychiatric Institute,
New York, New York, USA

ABSTRACT

As a grandchild of holocaust survivors, in a short narrative, Shelly Ben David weaves together family stories that she heard about the holocaust as a child, from her mother and stories from her own memories of her grandparents. She tries to identify what it means to be a grandchild of holocaust survivors in contemporary society now that they are no longer alive. She explores how her own third generation trauma from her grandparents still affects her identity and led her to take certain paths in her life. The alchemy of *weltshmertz* operates in mysterious ways. Did their abbreviated education crowd her into academia? An undergraduate degree in psychology and a Masters in Social Work seemed like a perfect fit at the time but their real liberation seems imminent through her story telling, her narrative becomes their unwritten epitaphs, dedicated to their struggles and haunting stories.

INTRODUCTION

Stepping into the crowded uptown New York subway after a long day at work, I feel the heat and pressure of other bodies. I become increasingly anxious as people jostle one another entering and exiting the car, and despite moving towards the middle, the activity around the doors ultimately reaches me. Bodies press in. My space becomes smaller. The New York commuters seem drained, even drowsy; people lean into each other with a kind of camaraderie that exists among seasoned commuters. Suddenly, the train comes to an abrupt stop and there is a muffled squeal from one of the passengers. The lights flicker on and off and the conductor makes an unintelligible announcement, "Aegesu fromble zzzt explosion gewraou!" People glance at each other furtively, each harboring their own particular fantasy

of doom. Throughout the car, these fantasies are punctuated by commonplace anxieties: will I get home on time to make supper, will he wait for me at the restaurant, has there been a terrorist infiltration of the subway station, did I turn the stove off, who will pick the kids up, will they hold the dress for me at Saks, will I be able to breath after all of the air in the subway car is used up? Then, just as if the last thought had not been my own, I hear someone say, "Oh my god, where is my inhaler?" People check their pockets and bags for necessary items. A young woman finds a package of Smarties and starts handing out pieces randomly, and, realizing that there is not enough for everyone, looks quietly down at her hands. One elderly woman begins to cry softly. A decrepit-looking man starts screaming, "Let me out, let me out, this is my stop to get off, I need to get off." Everyone avoids eye contact; some go so far as to turn their backs on him. The crying woman begins to moan. *Where are we going, where are they taking us? What have we done to deserve this?* A little girl begins to sing a song called "Ochi Chyornye" (Dark Eyes). *They take the elderly, and the little ones, so unproductive*. Someone retches. *They take the sick*.

Then, just as unexpectedly as the subway car stopped, we are jolted forward and the train rolls to the saving gates of Columbus Circle.

A life begins, and is actualized, in mourning. My mother mourned her still-living parents. My grandfather, Morris, hung his Auschwitz uniform in his closet. No one wanted to touch it, and so it stayed there until his funeral. My uncle, the youngest, lifted the dusty, old jacket from its hanger and took it away. He might have burned it. He might have hung it in his own closet at home. What does one do with such a thing? When Morris' wife died, their daughter wailed uncontrollably. It was difficult to hear the rabbi over her cries. The crowd, as well as the rabbi, was uncertain what to do, and so did nothing. The woman was buried and my mother stopped crying, and, for good measure, stopped eating, too. This went on for weeks. I developed a similar coping mechanism as a teenager. When my boyfriend and I broke up last winter, I lost 7 pounds. It's not much, but I only weighed 115 pounds before.

This grief hollows you and fills the empty space with itself. The body is a shell. Or is it more intricate? Is the sadness a part of the composition of the body, the way oxygen moves, energizes you, but corrodes the very iron in your blood, making it red? Sometimes it is hard for me to distinguish whose sadness is in the "Shelly" that I remember, from the "Shelly" that my mother remembers; the sadness that she remembers from the sadness that her parents embodied for her. What is this "Shelly" then, when I can't eat? If you stripped away the memories of my family's past, would my grief affect me in a way that is amplified by the trauma of the holocaust? Is there one definite part of my identity that holds true, or is it an amalgam of the self combined with the projections of others' selves? Is there a way to compartmentalize my self?

PART 1: TRAUMA

When the human body undergoes excessive stress, a physiological reaction is triggered called the fight-or-flight response. It is not right to say the train cars that lifted the Polish from the ghettos to Auschwitz were cattle cars. The goal of a cattle car is to transport the animals alive. There was no room to breathe in the Auschwitz car. Many died. This response triggers a small region of the brain called the hypothalamus, which is associated with maintaining

homeostasis in the body. My grandfather was lying on the ground in Auschwitz, exhausted, when a new car was brought into the camp. My grandmother, whom he'd never seen before, stepped out of the tight, airless car. The dead were carried out behind her. Homeostasis is the tendency of a self-regulating system to hold its parameters in equilibrium. Her dress slid up her leg as she disembarked. Her hair was very blond. Morris looked on as this girl pulled down her dress, her blonde hair falling all around her shoulders. When the fight-or-flight response is activated, stress hormones are released into the blood stream. Did he say to his friends "That's the girl I am going to marry"? He must have said this in Yiddish or Polish, as he did not speak German yet. He said he would marry her. She pulled her hair back when she stood in line. These chemicals cause psychological and physiological changes in the body, preparing it for action. As blood rushes to the brain, the heart, and the striated muscles, the digestive system slows.

Before the camp, my grandmother passed as Aryan. Despite being 4'11", her blonde hair set her apart, making her appear taller and more confident. Her brown eyes glittered. When Esther was living in the ghetto, she smuggled liquor and goods in exchange for bread. Because of her fair complexion, she could tuck her star under her sleeve and walk freely through the streets. One day she was stopped by an SS soldier. He knew who she was, having seen her over the ghetto walls. Undeterred, she bargained for her life with a dimpled smile. She promised him some liquor, which could immediately be procured through the secret grapevine of communication within the ghetto, as well as a date if he would let her go home and change her clothes. He let her go. Her dress fluttered behind her as she walked off, but she would not see the guard again. One evening, not so long after, Esther and her father were at synagogue. Her mother and little sister stayed behind to light the candles for Shabbat. When Esther and her father returned, the candles were lit, but no one was there. Neighbors told them later that her sister and her mother had been arrested by the Gestapo. It would later be known as Aktion Rheinhardt. Were they taken to Babi Yar, Treblinka, or to a mass grave? No witnesses or records were made of their final journal.

The day came when Esther and her father, as well as many other neighboring Jews in the ghetto, were rounded up into cattle cars. People glanced at each other, harboring their own particular fantasies of doom. Esther began humming to herself the song of her youth: "Dark Eyes". When she stepped out of the cattle cars into Auschwitz, a gust of much needed fresh air brushed her face. She raised her head into the wind, her skin glowing. Her dress blew with the wind, revealing her legs, and she hastily pulled it back down while noticing the gaze of other prisoners surrounding the entrance. She flipped her blond hair and entered the gates with a growing relief at having escaped the tragic fate of her fellow passengers.

Morris courted the blonde-haired Esther in Auschwitz. Meanwhile, he became the personal chef for a Nazi officer. Morris would select the vegetables, the oils, and the meats, and prepare them for this Nazi. He would be sure to also save portions for Ester and her father. When the Nazi was relocated to another camp, Morris would not go unless Esther and her father came with them. And so, because the Nazi liked Morris' food, he let him take his Aryan-looking girlfriend and her father with them. One day Morris was able to sneak a cup of coffee from the kitchen -- a luxury, and forbidden. Morris and Esther were having a lovers' spat, and she took the coffee from his hand and flung it across the snow. He took back the cup and poured her another one from the kitchen.

At the end of the war, when even the meager rations had run out, their bodies thinned. Some bellies filled up with liquid and gas. Some melted back towards the spine. When the

Allied soldiers arrived, those left alive were gathered in a large hall. Long tables were set up and platters of food were carefully placed on them. There were meats and rich sweets. Nuts, fatty things. Bread. So much bread the smell made Esther dizzy. "Careful girls, careful," she said. But the women fell upon the trays of chocolate as if it were manna. They gorged themselves until they began to retch. Some sank to the ground. When the shock set in, they lost all sensibility and curled into fetal positions, chocolate smeared at the corners of their mouths. Esther, holding a bit of bread, saw them collapse. She lost what little appetite she had. She finished the bread. Maybe a little butter. Some coffee.

PART 2: RESILIENCE

My mother speaks of her childhood in academic language: "By the time that we could speak, we were doing it in several languages. We were encyclopedias of information regarding human suffering and the cruelty of prejudice." As long as my grandmother, Esther, was alive, her three children never stopped hearing about Auschwitz -- "Auschwitz for breakfast, Auschwitz for lunch, Auschwitz for dinner." Esther was described as a tortured soul, but very good natured.

When my mother was 18, she went to *my* friend Esther's house for brunch. As they all sat around the table, the family was engaged in cheerful, early morning. My mother thought to herself with indignation, "Will no one raise a crust of rye bread and comment on its size, the heft, the unbearable freshness of it compared to the daily rations at Auschwitz?" It was then that my mother realized that this is what most breakfast tables aspire to be, although any mention of Dachau, even Lager or Bergen Belson, would have been a comfort to *me* at that moment.

On a visit to her hospital room shortly before my grandmother's death, my mother asked her if she realized that she had fed them a steady diet of concentration camp stories at every mealtime during their formative years. "Really?" she said and then asked, "Did it trouble you?" The only response my mother could muster was, "No, mom. Really, it's okay."

What does it mean to be a tortured soul? Does a diagnosis of Post Traumatic Stress Disorder ever focus on a person's strengths? My grandmother was a very strong woman, and her sense of justice was highly developed. When I was a young child, my mother and I used to sit together and read books on slavery and genocide and discuss the dangers of prejudice. Was this a diluted form of the constant discussion of Auschwitz that was common in my mother's childhood? Despite severe trauma, my grandmother's resilience shone through in unexpected moments. Those moments will stay in the memories of *her* children which are then passed on to *their* children.

Over the phone one day, my uncle, Irving, tells me a story that has ultimately developed the person he has become: strong, proud, accomplished. He begins in a theatrical voice, "The Black Diamond Riders were a motorcycle gang notorious in the Toronto neighborhood where my mother grew up." The gang headquarters was located around the corner from the local McDonald's. One day, Esther and eight year old Irving decided to walk to McDonald's to get a Filet-O-Fish -- according to Esther's expert opinion, the Filet-O-Fish qualified as kosher. Irving listened to his mother as she chatted away, her manner relaxed and happy. All of a sudden her mood altered; she stiffened and became silent, her body tensed**.** Irving, confused

by the change in mood, glanced around the parking lot in search of some cause. His gaze fell upon a large man standing in front of the entrance of the restaurant. He was dressed in a leather jacket and black boots, and it was clear that he was part of the motorcycle gang. The biker finished his cigarette and entered the McDonald's to place his order. Esther remained quiet and distracted as they entered the McDonald's moments later. While Irving focused on filling his stomach; Esther, not interested in eating**,** searched through the dining crowd. Finally, her gaze fell upon the same man they saw outside. Without hesitation she made her way towards the man and sat down in front of him. Irving, not knowing what to do, followed his mother and sat down in the seat next to her. Esther began pointing at the man's jacket sleeve and asked him if he knew what the symbol on his jacket represented. For the first time, Irving noticed a large swastika sewn onto his sleeve. Without giving him time to respond, Esther told him how she had been forced to wear the symbol of the yellow star, which indicated she was a Jew and which led ultimately to the genocide of 6 million Jews and hundreds of thousands of Gypsies, mentally handicapped, homosexuals and Catholics. Without a moment of hesitation, the man stood up and ripped off the swastika from his jacket. He then walked over to the garbage can and threw it in with a grandiose gesture. At that moment Irving was filled with so much pride for his mother.

When my grandmother died at the age of 67, her voice was silenced. Her constant chatter of the holocaust ceased to exist the moment her heart stopped beating. As if awakened out of a stupor, Morris began to fill in the empty space with his own stories of horror.

Scramble the onions and fry the eggs. Pull out a plate and fork in that order: efficiency and safety. It feels good when everything is in order. *What is this constant sadness that I feel pumping through my veins? Who are those voices, crying out, burning up?* Place this body of mine on the couch, fork in mouth. *I must always stay suspicious of those around me, even my best friend.* I feel a strange pain in my chest. *Don't worry, Gittel, we will not separate. I will find a way to keep us together.* Sudden sharp pain; then there is emptiness.

Was this what my grandfather was thinking before he passed away? Morris died on his couch of a heart attack, his fork still resting near his mouth. They say he felt no pain, that it was instantaneous. But no one really knew the type of pain my grandfather felt, for at the age of 79 he was at the beginning stages of advanced Alzheimer's. In his last few years, my grandfather began to confuse the past with the present. This confusion was unsettling for everyone around him. His steel blue eyes would gaze into my brown eyes, always searching for something inside of me. It is as if he recognized another person within me, but he never recognized me. Who was I but a memory in his past?

PART 3: NEW TERRITORY

I was born in Israel -- Jerusalem, to be exact. My mother was born in Canada; my father was born in Iran. They met in Israel at an intensive Hebrew language course. My mother, Helena, would always laugh in the back of the class, her green eyes happy. My father, Shahram, would sit up in the front, quiet and serious. I lived in Israel until the age of five and my memories are filled with long sandboxes, beaches, and white colored homes hewn out of stone. Moving to Canada was uneventful for me. Later on, when I was older, I was told that my father was stopped at customs on his way through Canadian immigration. Was it because

of the color of his skin? Or was it the place of birth on his passport? Or, maybe, it was his accent. When we immigrated to Canada, we stayed in my grandparents' apartment in Toronto until my parents were able to find their own place. It was my introduction to Esther and Morris and the snow.

Gripping my mother's hand tightly, we entered my grandparents' apartment. I was seven years old. I remember the smell of the little, individually wrapped soaps from my grandfather's hotel in their bathroom, and a few scattered tiny toy animals that were perched on the tub. I may have slipped one of the toys in my pocket for safe keeping. There was a nervous energy in the apartment that day; I remember thinking to myself while smelling the soaps in the bathroom. The apartment was empty. Everyone was somber, Esther had just passed away. My grandmother had died and I was too young to realize what had happened. My mother was in the back room, packing up my grandmother's belongings. I wandered into the room; my pockets filled with soap, and saw my mother crying. She began pulling out thousands of dollars which my grandmother had hidden away from my grandfather in drawers. She laid out the money in rows across the twin bed until the whole bed was covered. My grandmother had managed to hide $45,000 in twenties from my grandfather, just in case the money would be needed one day.

My grandfather was a very prominent figure in our household. He came every Friday night for dinner. He became known as the "paper boy" as he dropped off the newspaper that he had already read each day. He drove me and my brother to school every day, and in my teen years we lived in his home for six months.

The strong, oppressive smell would drift into my bedroom every morning for six months and settle on my clothes. Cognizant at the time and always an early riser, my grandfather would prepare his signature breakfast: scrambled eggs and fried onions, lots of fried onions. Too many fried onions! We would escape outdoors, away from the smell and away from the tiny space. We would stay away from his orderliness, away from the tension and the sadness. It hung over us, and was almost suffocating. It was not easy living with my grandfather. He was a very difficult, suspicious and troubled man. However, he never failed to bring his cooking to family dinners. This was when he was in his element. Every Passover, my grandfather would cook his famous gefilte fish to the pleasure of his children and grandchildren. He would sit at the head of the table and as he got older his blue eyes become hazy and unfocused, his memory failing. When he passed away, I was confused. I saw him every day for 19 years of my life but we were never close. I volunteered to be one of the pallbearers, lifting his coffin up with my cousins. And then it hit me: He was dead. How could a survivor pass away? I was overcome with grief. Over the years, that question has evolved into a different one: How did he, they, *anyone* survive?

On the last day, the women were rounded up and taken to one of the largest rooms of the factory. The doors were fantastically huge, like the doors you might find in an evil castle in a fairy tale. *Esther gets on the 2 train heading towards the Bronx. She notices the rundown conditions of the neighborhood and sighs to herself.* It was hot, too hot for the windows to be closed, and the air started to become scarce. Some of the women started to panic, crying, screaming and fainting. The windows were too high up to open and death by asphyxiation seemed inevitable. *Later that day, she gets off at the 125th St. Station: the end of Harlem and the beginning of Morningside heights. She walks towards campus, the large walls separating Columbia from the neighborhood loom over her like a fortress, protecting their future scholars.* Suddenly, the two large doors opened and a soldier on a white horse gallantly

trotted into the room. Some of the girls started to laugh hysterically at the absurdity of the situation. Not Shelly, she pulled her 5' 3 " frame erect and marched up to the horse, threw her head back, as a princess might have, and addressed the soldier, first in Hebrew, then in English, then in French, "It's too hot in here! We are suffering. Would you be so kind and open the windows for us?" But the soldier was Ukrainian and did not understand her request initially. *Every day Esther goes to school and work and notices inequalities everywhere she turns; her spirit surged with anger, her mind strategizing for action.* When he finally understood her plea, he lifted his large truncheon and carefully backed the horse away from her, trotted over to the row of windows and systematically broke each one all the while repeating, as if to himself in a chant, "Breathe girls, breathe. You are free. We have come to save you." *Esther's commitment to fighting injustice is deeply rooted within her. She will stand up when no one is standing and she will continue to fight when no one is listening. One day, someone will hear her.*

It is snowing outside. Tiny flakes of fresh snow blow in through the broken windows. Other flakes find their way onto my cheeks as I navigate through the streets of Chelsea. I find the building that I am looking for and collect myself. These visits are always unique; I never know who I am going to meet. I enter the elevator and press the button for the 8th floor. Apartment 8a looms in front of me, and I quickly ring the doorbell. A quiet voice from the other side of the door asks "Who's there?" I respond, "My name is Shelly and I am here to renew your Meals on Wheels. We talked on the phone earlier today." She responds quickly, "What do you mean 'renew my Meals on Wheels'? Why would you need to do something like that? I am 85 years old! I am an old lady, just let things be. I won't let you take away my meals." "No, no, I am not here to take away your meals. We do this every six months, just to see how things are going. We are mandated to do this." "What's your family name?" she asks suddenly, as if the right answer would allow me passage into her world. "My name is Shelly Ben David." The door opens and there stands a little woman. She is 4'11", with deep brown eyes that gaze into mine with a sudden recognition. I suddenly feel dizzy and weak, my heart begins to pound. I am led into her home and sit at her kitchen table waiting for her to gather all of her prescription bottles so I can record any changes -- a tedious task. I glance at her stove in response to the delicious aroma coming from her pot. "Chicken soup", I think to myself as my mouth waters. I wait for Esther to pour some soup into a cup for me, just like she did when I was a little kid with an ear infection. Sitting across from me, Esther begins talking about how she would prefer a kosher meal. I reply that the waiting list is very long, but that I will keep her in mind for the future. She nods, satisfied with my answer, and we breeze through the assessment. It is soon time to go home. I stand up and shake her soft hand. I leave her apartment, glance down at my list, and cross off "Sharon Goldstein".

A little later, I stand on the subway tracks, and begin to cry silently. What would you have been like if you were still alive? What would we have talked about? It hurts so much. I am a social worker because of you. I will always fight against injustice; my heart will always ache when I see ignorance. The subway comes and a gust of wind from the force of the train blows my hat off. I pick it up and shake my dark hair. I enter the subway with confidence. I am here to continue to do my grandmother's work because the seed of injustice that led to the circumstances of the holocaust is still alive.

EPILOGUE

One year later I sit in my new office at Columbia University Office of Disability Services. An event of significant controversy is taking place several floors below me. The President of Iran, against the protests of Columbia students, is giving a speech. Later that day, I walk across campus listening to the protesters and reading their messages. One message by the Iranian president catches my attention, "Today, European countries have created a myth in the name of the holocaust and consider it to be above God, religion and its prophets." During his speech, the Iranian president discussed how it was important to continue scientific investigation on the holocaust. His interest was not in finding out the truth, but rather continuing to question its existence. My body trembled. I felt Esther's presence within me and I filled up with her sadness at his audacity -- but the sadness was also completely mine.

INDEX

A

abnormalities, 98, 99, 127, 164, 204, 269, 270
abstinence, 21
abusive, 9, 256
academic difficulties, 162
accessibility, 58, 61, 229
accident victims, 152, 188, 274
accidental, 44, 116, 117, 118, 184, 236, 238, 243
accidents, 39, 50, 77, 116, 117, 139, 146, 158, 159, 160, 166, 184, 188, 190, 206, 227, 228, 231, 236, 238, 245, 251, 267
acclimatization, 50
accounting, 68, 206, 241
accuracy, 77, 78, 79
acid, 98, 105, 125, 126, 269, 270, 274
ACTH, 269
activation, 23, 97, 124, 159, 164, 167, 206, 259, 269
activity level, 226
acute, 45, 99, 105, 106, 114, 124, 125, 126, 151, 152, 158, 171, 184, 188, 191, 213, 227, 234
acute stress, 45, 99, 106, 114, 124, 126, 158
Acute Stress Disorder, 158
Adams, 138, 198, 199
adaptability, 11
adaptation, 10, 18, 97, 130, 152, 159, 165, 166, 203, 212
addiction, 185
adipose, 164
adipose tissue, 164
adjustment, 17, 19, 21, 54, 56, 97, 108, 115, 123, 126, 138, 148, 222, 227, 230, 239
administration, 68, 78, 125, 164, 235, 236, 269, 274
adolescence, 41, 50, 51, 59, 60, 103, 110, 158, 164, 168
adolescent behavior, 115
adolescents, 10, 12, 16, 50, 56, 111, 158, 159, 160, 162, 164, 165, 166, 168, 169, 176, 195, 261, 262, 275
adrenal gland, 124
adrenaline, 103
adult, 11, 55, 102, 108, 109, 111, 112, 136, 138, 158, 161, 163, 164, 168, 199, 214, 239
adult population, 239
adulthood, 101, 103, 110, 213, 267
adults, 12, 40, 49, 51, 55, 56, 67, 79, 103, 104, 110, 139, 150, 158, 159, 160, 162, 164, 165, 175, 176, 191, 195, 199, 214, 261, 275
adverse event, 22, 97, 103, 105
advocacy, 9
aetiology, 149
affective disorder, 57, 59, 95, 105, 136
Afghanistan, 27, 29, 34, 40, 54, 130, 132, 181, 182, 195, 200, 213, 214, 222, 227, 231, 233, 239, 245, 247, 253, 259, 265, 267, 270, 271, 273
Africa, 122, 141, 147, 152, 153
African-American, 200
age, 10, 21, 22, 31, 36, 41, 45, 47, 50, 52, 59, 65, 67, 77, 82, 103, 110, 111, 115, 116, 117, 126, 128, 158, 159, 160, 162, 163, 164, 165, 169, 174, 176, 203, 205, 206, 207, 208, 225, 226, 227, 231, 236, 238, 241, 246, 250, 267, 268, 269, 281
ageing, 173
agent, 7, 115, 144, 256
agents, 128, 129, 211
aggression, 3, 4, 6, 7, 8, 10, 11, 13, 18, 21, 25, 45, 46, 64, 67, 97, 99, 102, 107, 121, 128, 159, 191, 212, 264
aggressive behavior, 8, 21, 129, 203, 205, 257
aggressiveness, 7, 99, 101, 203, 205, 208
agricultural, 18
aid, 120, 150, 267
air, 11, 16, 162, 175, 206, 278, 279, 282

Air Force, 123, 243, 248
Aircraft, 174
Albert Einstein, 6
alcohol, 28, 46, 47, 59, 105, 111, 114, 118, 120, 126, 127, 128, 131, 134, 142, 190, 191, 203, 205, 208, 211, 212, 222, 227, 235, 237, 239, 240, 243, 246, 267, 272
alcohol abuse, 46, 47, 114, 128, 131, 142, 203, 205, 208, 239, 243
alcohol consumption, 211, 240
alcohol dependence, 111, 127, 205
alcohol use, 105, 126, 243, 246
alcoholism, 71, 95, 97, 105, 129, 275
alertness, 211
alienation, 254, 255, 260
alleles, 110
alpha, 269
alternatives, 33, 243, 256, 259
amalgam, 278
ambivalence, 182
ambivalent, 4
American Psychiatric Association, 14, 24, 50, 131, 132, 138, 150, 166, 177, 215, 272, 273
American Psychological Association, 152, 263
amnesia, 114, 191
amputation, 185
amputees, 182, 185, 188
Amsterdam, 75, 78, 79, 80, 81, 82, 87, 91
amygdala, 101, 104, 124, 144, 160, 164
amyloidosis, 186
androstenedione, 126
anger, 50, 114, 243, 283
Anhedonia, 132
antagonistic, 137
antagonists, 144
antecedents, 20, 101
anthropological, 15, 57
antidepressant, 39, 128, 216
antidepressants, 23, 28, 34, 128, 211
antipsychotics, 129
antisocial behavior, 10, 20, 22, 23, 159
anxiety disorder, 105, 114, 117, 126, 128, 151, 158, 165, 166, 205, 266, 268
anxiousness, 103
apartheid, 147
APOE, 161
appetite, 50, 268, 280
application, 39, 74
argument, 66, 67, 77, 88, 90
Aristotle, 4, 14
armed conflict, 18, 21, 48, 51, 174, 267
armed forces, 232, 238, 241, 242, 244
Armed Forces, 221, 222, 223, 224, 225, 229, 230, 247
Armenia, 168
Army, 27, 29, 30, 31, 32, 34, 35, 36, 37, 38, 45, 48, 117, 123, 130, 134, 135, 139, 189, 198, 201, 223, 224, 225, 228, 232, 237, 245, 246
arousal, 18, 24, 43, 114, 145, 158, 174, 175
arrest, 11, 84
artery, 268
arthritis, 268
ASD, 158
Asia, 15, 141, 153
assassination, 263
assault, 115, 146
assaults, 146
assertiveness, 129
assessment, 23, 28, 46, 55, 63, 68, 103, 106, 118, 125, 130, 138, 142, 149, 174, 176, 191, 195, 197, 201, 203, 211, 212, 215, 246, 258, 260, 272, 283
assets, 75, 201, 248
assumptions, 31, 39
asylum, 135
Athens, 157, 166
Atlantic, 248
atmosphere, 9, 45, 58
atmospheric pressure, 192
atrocities, 13, 44, 50, 115, 119
attachment, 11, 64, 103, 267
attacks, 3, 5, 9, 11, 12, 16, 40, 49, 104, 148, 161, 163, 168, 175
attitudes, 30, 50, 62, 68, 131, 215, 257, 264
attributable fraction, 110
attribution, 151
Australia, 39, 66, 68, 69, 228, 230, 237, 239, 243, 274
autopsy, 28, 52, 104, 134, 224, 231
availability, 20, 30, 46, 67, 68, 71, 97, 210, 231, 269
averaging, 129
aversion, 149, 259
avoidance, 11, 43, 51, 114, 119, 128, 131, 159, 162, 174, 175, 183
avoidance behavior, 162, 183
awareness, 11, 14, 50, 54, 119, 145, 146, 176, 192, 224, 243, 244

B

babies, 161, 168
BAC, 134
background information, 189
backlash, 146
Baghdad, 222
barriers, 54, 243, 247, 273
basic needs, 161

BDNF, 161
beating, 281
behavior of children, 25
behavior therapy, 22, 23, 204, 212
behavioral dimension, 21
behavioral disorders, 12, 132, 161
behavioral manifestations, 157
behavioral problems, 158
behavioural disorders, 216
behaviours, 110, 215, 229
Belgium, 62, 77, 80, 82
belief systems, 11
beliefs, 32, 145, 241, 259
belongingness, 195, 196, 197, 251, 252, 254, 255, 258, 259
beneficial effect, 129, 272
benefits, 20, 24, 33, 131, 141, 146, 177, 211, 234, 273
benign, 8, 68
benzodiazepines, 54
bereavement, 11, 22, 28, 104
bias, 28, 136, 176
binding, 99, 100, 107, 108, 126, 214
biofeedback, 129
biological markers, 102, 267
biomarkers, 109, 160
biosynthesis, 99
biotechnological, 143
bipolar disorder, 41, 127, 205, 276
birth, 17, 77, 79, 103, 251, 271, 282
blame, 142
blindness, 46, 182, 185, 186
blood, 97, 125, 134, 137, 150, 165, 278, 279
blood flow, 150
blood pressure, 97, 171
blood stream, 279
BMI, 240
bodily injury, 183
body image, 181, 185
booms, 75
borderline, 9, 10, 97, 128, 261
borderline personality disorder, 97, 128, 261
Bosnia, 43, 47, 49, 51, 56, 163, 168, 169
Bosnia-Herzegovina, 56
Bosnian, 47, 51, 55, 168, 273, 274
Boston, 15, 113, 275
brain, 9, 44, 99, 101, 104, 106, 107, 109, 111, 125, 144, 157, 160, 161, 164, 166, 182, 186, 190, 191, 196, 198, 200, 202, 203, 204, 205, 206, 207, 210, 211, 213, 214, 215, 216, 217, 253, 269, 278
brain damage, 196, 206
brain development, 157, 164
brain functioning, 106, 190
brain injury, 181, 182, 186, 188, 189, 198, 199, 200, 201, 203, 204, 205, 206, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 229, 253, 271
brain structure, 109
brainstem, 160
breakdown, 9, 12, 19, 25, 78, 141, 149, 203, 208, 210
Britain, 76, 77, 80
broad spectrum, 211
Brussels, 80
burdensomeness, 195, 196, 197, 201, 249, 251, 252, 253, 254, 257, 258, 260, 261
burn, 152, 182
burning, 281
burnout, 11, 41
burns, 182, 186

C

Cambodian, 51, 55, 162, 169
campaigns, 231
Canada, 15, 228, 281
cancer, 118
candidates, 105, 131, 269
Cape Town, 141
capitalism, 60
Capitol Hill, 271
carbohydrate, 165
carbon, 241
carbon monoxide, 241
cardiovascular disease, 118, 267
cardiovascular system, 97
caregiver, 254
castration, 185
catastrophes, 46, 157
catecholamine, 160, 167
catecholamines, 124, 159, 164, 167
catharsis, 14
Catholics, 19, 24, 74, 75, 76, 77, 80, 85, 281
cattle, 278, 279
Caucasian, 121, 208, 239
causal relationship, 28, 36, 60
causality, 11, 98, 192, 203, 208
censorship, 68, 79
Centers for Disease Control (CDC), 229, 236, 237, 245
central nervous system, 125, 170
cerebral contusion, 207
cerebrospinal fluid, 98, 107, 108, 160, 168, 188, 269, 274
cerebrovascular, 165
cerebrovascular disease, 165
changing environment, 9
chemical weapons, 48

chemicals, 279
Chernobyl, 133
child development, 50
child maltreatment, 49, 102, 167
childhood, 5, 11, 12, 20, 22, 28, 35, 50, 59, 60, 97, 98, 103, 109, 110, 115, 124, 126, 136, 157, 160, 163, 164, 165, 166, 167, 168, 170, 205, 229, 233, 267, 280
childhood sexual abuse, 35, 110, 126, 164, 170
children, 3, 9, 10, 11, 12, 16, 17, 21, 22, 25, 46, 49, 50, 51, 53, 54, 56, 59, 60, 74, 75, 78, 79, 81, 89, 91, 103, 105, 121, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 168, 169, 170, 173, 174, 176, 177, 240, 263, 280, 282
chocolate, 280
cholesterol, 125
Christians, 92
chronic fatigue syndrome, 253
chronic illness, 41, 268
chronic pain, 47
chronic stress, 49, 52, 97, 100, 113, 116, 136, 159, 166, 171, 265
chronically ill, 129
circadian, 160
circadian rhythm, 160
circulatory disease, 171, 185
citalopram, 128, 211
civil servants, 81, 87
Civil War, 21, 25, 47, 53, 65, 66, 69, 114, 141, 143
civilian, 11, 27, 30, 31, 32, 34, 37, 40, 63, 64, 66, 68, 69, 74, 128, 129, 130, 143, 148, 181, 189, 190, 192, 193, 195, 222, 223, 229, 230, 232, 254, 255, 260, 266, 270, 271, 275
classification, 132, 169, 198, 200
clients, 197, 243
clinical assessment, 100, 159
clinical diagnosis, 158, 162
clinical disorders, 106
clinical psychology, 138
clinically significant, 49, 127, 184
clinician, 54, 129, 193, 194, 195, 253
clusters, 119, 121, 174, 266
CNS, 54, 160
Coast Guard, 123
Cochrane, 151, 152
codes, 59, 227
coding, 73, 76, 78, 79, 83, 85, 86, 87
coercion, 4
cognition, 5, 18, 129, 199
cognitive behavior therapy, 23, 204, 212
cognitive development, 12
cognitive disorders, 9
cognitive dissonance, 30, 33
cognitive domains, 50
cognitive dysfunction, 127, 192, 196
cognitive flexibility, 104
cognitive function, 211
cognitive impairment, 194, 195, 197
cognitive process, 129, 259
cognitive processing, 129
cognitive profile, 213
cognitive style, 12
cognitive therapy, 129
coherence, 176, 177
cohesion, 12, 66, 70, 76
cohesiveness, 65
cohort, 40, 47, 62, 69, 103, 117, 118, 184, 187, 204, 224, 226, 227, 230, 233, 236, 240, 243, 245, 247, 248
college students, 195, 262
Colorado, 189
Columbia University, 14, 95, 102, 106, 265, 277, 284
common symptoms, 193
communication, 11, 55, 161, 200, 279
communication systems, 200
communist countries, 68
communities, 8, 16, 24, 25, 32, 141, 148, 166, 174
community, 5, 11, 12, 20, 22, 30, 33, 35, 38, 49, 56, 63, 66, 71, 97, 103, 123, 133, 158, 162, 195, 200, 204, 215, 216, 230, 250, 256, 257, 258, 259, 268, 275
comorbidity, 44, 46, 47, 55, 61, 117, 120, 124, 133, 134, 135, 166, 183, 239, 264, 268, 271, 273, 275
compassion, 141
compensation, 142, 146
competence, 20, 22, 25, 249, 251, 252, 255
competition, 18
complement, 125
complex interactions, 176, 184
complexity, 58, 64, 102, 106
compliance, 59, 60, 82
complications, 159, 239
components, 106, 125, 194, 195, 197, 231, 252, 254, 258, 271
composition, 124, 278
computed tomography, 151
concentration, 47, 49, 51, 52, 82, 107, 114, 127, 137, 164, 175, 191, 266, 280
conceptual model, 194
conceptualization, 67
conceptualizations, 194
concussion, 192, 204, 207
conduct disorder, 50, 204
conduct problems, 51
conductor, 277

confession, 76, 78, 82
confessions, 5, 80
confidence, 19, 224, 226, 228, 237, 283
confidence interval, 224, 226, 228, 237
confidence intervals, 224, 228, 237
configuration, 87
conflict, 4, 5, 7, 10, 12, 13, 14, 18, 33, 39, 43, 47, 55, 59, 60, 64, 65, 66, 123, 141, 142, 143, 145, 147, 148, 173, 175, 176, 185, 189, 210, 221, 222, 223, 225, 226
conflict resolution, 13
confrontation, 4
confusion, 28, 45, 46, 50, 255, 281
Congress, 15, 80, 190, 191, 198, 228, 231, 233, 248
connectivity, 101
consciousness, 146, 190, 191, 204, 205
consensus, 29, 57, 151, 235, 236, 244
constraints, 258
consumers, 23, 143
consumption, 211, 240
continuity, 8
control, 6, 15, 20, 24, 39, 46, 48, 49, 54, 58, 61, 99, 101, 108, 111, 116, 117, 120, 121, 127, 130, 132, 160, 199, 201, 204, 213, 223, 226, 240, 247, 267, 269, 273
control group, 49, 101, 117, 121, 127, 223, 226, 269
controlled studies, 129
controlled trials, 211
convergence, 88
conversion, 46, 158
conversion reaction, 46, 158
coping, 25, 132, 169, 217
coping strategies, 197, 212, 260, 266
coronary artery disease, 268
correlation, 18, 125, 126, 148, 206, 266
correlations, 106
cortex, 99, 101, 104, 107, 108, 144, 150, 160, 206
corticosteroids, 170
corticotrophin releasing hormone, 269
corticotropin, 107, 108, 167, 275
cortisol, 100, 101, 102, 105, 108, 112, 124, 125, 136, 137, 159, 160, 161, 164, 166, 167, 168, 269, 274
costs, 133, 267
counseling, 31, 131
couples, 49, 89
covering, 129, 228
CRH, 100, 107, 108, 159, 160, 165, 269, 275
crime, 79, 84
crimes, 8, 9, 53, 84, 85, 175
criminal behavior, 9
criminality, 9
criminals, 10
crisis intervention, 243
critical period, 157, 158, 160, 166
critical variables, 160
criticism, 143
Croatia, 51, 55, 56, 57, 58, 62, 65, 66, 67, 70, 71, 127, 273
crops, 121
cross-cultural, 6, 134
cross-sectional, 33, 223
CRS, 248
crust, 280
crying, 44, 50, 278, 281, 282
CSF, 98, 99, 100, 101, 103, 105, 106, 107, 108, 109, 111, 137, 160, 167, 184, 269
cues, 158, 257
cultural differences, 60
cultural factors, 123, 147
cultural norms, 243
culture, 3, 5, 9, 10, 13, 19, 45, 142, 147, 151, 166, 193, 195, 242, 247, 261
curriculum, 12
cytokines, 160, 168, 184, 188

D

danger, 22, 127, 148, 257
data collection, 28, 162
database, 28, 39, 193
death rate, 268
deaths, 4, 66, 71, 77, 78, 83, 116, 117, 118, 122, 133, 162, 185, 209, 221, 223, 225, 226, 227, 228, 230, 232, 236, 240, 241, 243, 250
decision makers, 35, 38, 39
decision making, 37, 276
decisions, 5, 8, 30, 33
defence, 34
defense, 9, 13, 50
defense mechanisms, 50
defenses, 176
deficit, 50, 191
deficits, 121, 146, 162, 164, 166, 195, 200, 203, 204
definition, 4, 6, 82, 97, 114, 142, 143, 204, 222, 223
degradation, 5
dehydroepiandrosterone (DHEA), 125, 137
delusions, 114, 119
demographic characteristics, 59
demographic data, 118
Denmark, 62, 76, 122
density, 99, 101, 115
Department of Defense, 193
Department of Health and Human Services, 231
deported, 82, 86, 88
depressed, 6, 43, 46, 53, 99, 100, 101, 108, 111, 115, 120, 124, 125, 126, 127, 137, 205, 250, 268, 269, 274

depressive disorder, 44, 45, 46, 50, 100, 108, 109, 143, 158, 184, 191, 204, 227, 265, 267, 275, 276
depressive symptoms, 22, 46, 48, 49, 50, 51, 100, 136, 158, 183, 211, 239, 252
deprivation, 49, 161, 210
desensitization, 22, 129
Desert Storm, 132, 135, 139, 246
desipramine, 128, 211
destruction, 3, 5, 6, 8, 10, 12, 13, 14, 33, 34, 45, 81, 246
detachment, 114, 255
detection, 184
detention, 11, 173
determinism, 8
developed countries, 229
developing brain, 112, 164
developmental disorder, 166
developmental process, 159
developmental psychopathology, 16
dexamethasone, 98, 100, 107, 111, 124, 136, 168, 269, 275
dexamethasone suppression test, 98, 107, 111, 136
diabetes, 165, 268
diabetes mellitus, 165
Diagnostic and Statistical Manual of Mental Disorders, 118, 138, 150, 272, 273
diagnostic criteria, 50, 116, 121, 122, 191
Diamond, 280
dichotomy, 18
Dicks, 9, 15
dictatorship, 13
differential diagnosis, 44, 45
differentiation, 8
diffusion, 88, 125
diffusion process, 88
disabilities, 195, 253, 254, 258, 268
disability, 5, 47, 55, 114, 143, 144, 146, 153, 181, 185, 190, 192, 195, 196, 197, 198, 200, 203, 204, 244, 253, 254, 268
disabled, 186, 190, 198
disaster, 61, 63, 166
discharges, 230
discipline, 19, 36
discomfort, 142
discourse, 143
discrimination, 147
diseases, 58, 145, 185
disinhibition, 101, 194, 203, 204, 206
displaced persons, 5, 150
displacement, 47, 49, 173, 193
dissatisfaction, 240
dissociation, 119, 129, 158
dissociative disorders, 50
distress, 19, 24, 49, 119, 125, 135, 141, 142, 143, 145, 146, 147, 148, 149, 150, 158, 189, 190, 192, 196, 197, 210, 262, 266, 267, 268
distribution, 39, 99, 224
divergence, 166
diversity, 5
division, 4, 97
divorce, 28, 33, 75, 114, 210, 255
dizziness, 142, 191, 193
doctor-patient, 147
doctors, 11, 182
domestic violence, 49, 266
domestication, 18
dominance, 7
doors, 277, 282
dopamine, 124, 144, 161, 270
dopaminergic, 98, 265
down-regulation, 100
draft, 251, 261
dropouts, 103
drowning, 60, 122, 184, 223, 250
drug abuse, 28, 54, 267
drug addict, 57
drug addiction, 57
drug dependence, 132, 227
drug therapy, 35, 39
drug treatment, 216
drug use, 132, 191
drug-related, 118
drugs, 28, 34, 35, 37, 57, 61, 127, 128, 145, 184, 267, 268
DSM, 47, 111, 113, 114, 118, 122, 126, 135, 138, 142, 143, 158, 166, 174, 175, 266, 268, 273
DSM-II, 111, 113, 114, 118, 122, 135, 143, 266
DSM-III, 111, 113, 114, 118, 122, 135, 143, 266
DSM-IV, 47, 122, 126, 138, 142, 144, 158, 166, 174, 175, 266, 268, 273
duration, 33, 44, 45, 57, 59, 60, 144, 157, 174, 175, 201, 235, 244, 272
duties, 79, 224, 225, 231, 242, 254
dyslipidemia, 165
dysphoria, 47, 269
dysregulation, 157, 160, 167, 269
dysthymia, 117, 120, 267, 271

E

earth, 7
earthquake, 69, 166, 168
eating, 50, 278, 281
eating disturbances, 50
ecological, 122
economic activity, 64
economic change, 37, 60

economic problem, 23
economic status, 225
Education, 24, 189, 235
educational process, 19
EEG, 139
El Salvador, 25
elaboration, 88, 89
elderly, 10, 36, 41, 174, 175, 216, 238, 240, 278
electricity, 39
electrocardiogram, 127
eligibility criteria, 228
emigration, 55
emission, 150, 151
emotion, 114, 242
emotional, 5, 11, 12, 19, 23, 28, 30, 32, 45, 46, 49, 50, 53, 97, 102, 103, 114, 119, 127, 132, 145, 157, 158, 160, 161, 162, 163, 184, 185, 186, 191, 192, 195, 196, 199, 203, 204, 205, 211, 212, 213, 217, 235, 252, 254, 255, 259, 263, 266
emotional abuse, 103
emotional distress, 45, 192, 196, 205
emotional exhaustion, 11, 49
emotional reactions, 185
emotional responses, 45, 53, 163
emotional state, 5, 28
emotional well-being, 191
emotions, 5, 14, 119, 145, 197
empathy, 22
employment, 59, 60, 69, 253, 258
employment status, 59, 60, 258
endocrine, 107, 161, 164
endocrine system, 164
endocrinological, 187
endophenotypes, 102
enemy combatan, 239, 270
enemy combatants, 239, 270
energy, 23, 43, 268, 282
engagement, 115, 124
engines, 150
England, 62, 71, 76, 153, 188, 231
environment, 9, 10, 12, 13, 17, 20, 21, 25, 45, 59, 60, 101, 102, 130, 159, 163, 164, 192, 194, 197, 210, 212, 229, 239, 247, 266
environmental change, 27
environmental conditions, 17
environmental factors, 3, 6, 50, 98, 106, 192, 193
environmental influences, 109
epidemiologic studies, 246
epidemiology, 54, 135, 168, 235, 272
epigenetic, 102
equilibrium, 279
escitalopram, 211
ester, 65
estradiol, 126
estrangement, 255
ethnic groups, 162
ethnicity, 126, 201
etiology, 50, 96, 118, 266, 269
Europe, 65, 74, 92, 122
euthanasia, 37
evacuation, 181
evening, 83, 125, 160, 168, 243, 279
evil, 5, 282
evolution, 4, 7, 44
excitability, 125
exclusion, 67, 127
excretion, 136, 160, 167
excuse, 4
execution, 162
executive function, 204, 205, 212
executive functions, 205, 212
exercise, 37
exploitation, 173, 176
explosions, 143
explosives, 67, 68, 71, 192
extinction, 150
extreme poverty, 13, 49
eye contact, 278

F

failure, 272
fainting, 282
fairy tale, 282
faith, 80, 104
familial, 50, 52, 62, 97, 190, 197, 267, 269
family, 3, 11, 12, 19, 20, 23, 38, 49, 54, 56, 59, 60, 66, 97, 102, 103, 115, 123, 127, 131, 158, 161, 163, 169, 175, 195, 197, 203, 211, 229, 235, 238, 243, 254, 255, 258, 259, 261, 266, 272, 274, 277, 278, 280, 282, 283
family environment, 238
family functioning, 54
family history, 97, 115, 127, 238, 272
family interactions, 97, 261
family life, 11
family members, 12, 49, 56, 161, 163, 197, 211, 255, 258, 259
family relationships, 229, 255
family structure, 59, 60
family studies, 102
family therapy, 23, 131, 259
family violence, 103, 163, 243
farmers, 71
farming, 71
fat, 164, 166
fatigue, 50, 114, 142, 159, 191, 204, 253

fear, 11, 12, 17, 46, 49, 70, 76, 77, 84, 88, 89, 91, 101, 114, 115, 122, 128, 144, 158, 240, 252, 255, 256, 258, 266, 267
fears, 11, 49, 50, 150, 162
feedback, 29, 32, 33, 37, 38
feelings, 11, 17, 35, 43, 44, 114, 116, 186, 195, 210, 241, 242, 254, 255, 258, 259, 268
females, 57, 58, 59, 60, 61, 65, 89, 163, 203, 206, 208, 210
fetal, 280
FFP, 168
fibromyalgia, 159, 167
finance, 33, 210
financial difficulty, 31, 34, 37
financial problems, 252
financial support, 195, 254
Finland, 203, 215, 222
fire, 30, 78, 241
firearm, 68, 121, 135, 208, 236, 239, 241, 250
firearms, 27, 30, 33, 58, 60, 61, 67, 68, 122, 212, 223, 241, 244, 250, 253, 257, 258, 260, 272
First World, 145
flashbacks, 44, 46, 119, 129, 259
flexibility, 11
flight, 47, 278
fluid, 98, 107, 108, 160, 168, 188, 269, 274
fluoxetine, 128, 138, 211
fluvoxamine, 128, 211
focus group, 139
focusing, 114, 123, 147, 244
folklore, 200
food, 23, 47, 82, 145, 161, 173, 279, 280
Food and Drug Administration, 39, 128
food stamp, 82
food stamps, 82
Ford, 139
foreign policy, 15
forensic, 10, 134
forgetting, 266, 273
forgiveness, 148, 152
fracture, 192, 207
fractures, 182
fragmentation, 9, 127
framing, 146
France, 33, 40, 62, 75, 76, 82
freedom, 9, 85
frequency distribution, 240
Freud, 4, 6, 7, 13, 14, 15, 143, 167
frontal lobe, 164, 203, 206
frustration, 8, 10, 46
full capacity, 78
functional magnetic resonance imaging, 269
functional MRI, 274

G

GABA, 161
GABAergic, 98
gamma-aminobutyric acid, 270
gangs, 12
gas, 163, 279
gastrointestinal, 268
Gaza, 56, 163, 170
Gaza Strip, 163, 170
GCS, 191
gender, 11, 21, 25, 48, 61, 70, 77, 82, 88, 89, 104, 111, 160, 207, 208, 215, 238
gene, 95, 102, 109, 137, 214
gene promoter, 109, 214
General Health Questionnaire, 125, 137, 224
general practitioners (GPs), 11, 16, 34, 210, 211
generalization, 263
generalized anxiety disorder, 46, 54, 158
generation, 19, 22, 135, 225, 246, 247, 277
genes, 96, 101, 102, 108, 161, 269
genetic control, 99
genetic factors, 98, 102, 271
genetic load, 102
genetics, 97, 107
Geneva, 14, 132, 198
genocide, 141, 280, 281
genome, 102
genotype, 102, 109
genotypes, 102
geriatric, 174
Germany, 69, 74, 76, 77, 80, 81, 82, 86, 88, 90, 173, 174, 228
gestures, 186
girls, 51, 167, 280, 283
globalization, 9, 16
glucocorticoid receptor, 100, 144, 161
glucocorticoids, 160, 164
glutamate, 270
goals, 18, 20, 74, 75, 183
God, 284
government, iv, 20, 27, 30, 32, 33, 34, 35, 68, 76, 81, 174, 243
Government Accountability Office, 231, 234
grades, 163
grading, 33
grandparents, 82, 277, 282
grassroots, 35
gray matter, 101, 104
Great Britain, 81
Great War, 76
Greece, 157, 158
greed, 8, 13

grey matter, 101, 104
grief, 30, 40, 63, 169, 176, 278, 282
grounding, 201
group membership, 10
group therapy, 129
groups, 5, 9, 10, 17, 18, 19, 24, 36, 48, 51, 52, 57, 65, 67, 74, 78, 80, 81, 90, 99, 105, 117, 123, 124, 125, 127, 130, 146, 157, 159, 162, 163, 164, 170, 173, 192, 206, 210, 221, 222, 224, 225, 226, 238, 241, 244, 251, 258, 261, 268, 269, 271
growth, 157, 160, 164, 166, 176, 177
growth hormone, 160, 164
guardian, 232
Guatemala, 51
guerrilla, 65, 121
guidance, 169, 231, 258
guidelines, 130, 132, 143, 149, 203, 210, 215, 273
guilt, 23, 46, 51, 113, 114, 116, 119, 121, 133, 235, 239, 240, 241, 242, 244, 247, 258, 263, 264, 268
Gulf War, 24, 25, 38, 41, 42, 46, 48, 53, 55, 56, 123, 135, 162, 222, 226, 227, 228, 230, 233, 245, 246
guns, 122, 257
Gypsies, 281
gyrus, 101, 109

H

habituation, 195, 196, 197, 255, 256, 257, 259
hallucinations, 114, 119
handicapped, 281
handling, 239
hands, 4, 133, 186, 278
hanging, 62, 121, 122, 241, 250
happiness, 75
harassment, 123, 158
harbour, 80
Harlem, 282
harm, 6, 38, 51, 111, 115, 128, 144, 145, 150, 182, 215, 223, 225, 226, 227, 231, 239, 249, 251, 252, 255, 256, 257, 258, 259, 260, 266
harmony, 150
Harvard, 113, 198, 201, 260
hate, 18, 22
hazards, 20, 226, 228
head injuries, 213
head injury, 97, 182, 190, 208, 209
head trauma, 96
headache, 193, 204
healing, 5, 14, 145
Health and Human Services, 231
health care, 13, 27, 31, 36, 38, 42, 46, 145, 153, 223, 230, 236, 238, 245, 246, 261, 268, 271
health care professionals, 223
health care system, 230, 246
health effects, 38, 228
health problems, 5, 49, 50, 54, 55, 103, 157, 223, 229, 231, 234, 237, 239, 240, 242, 247, 253, 262, 273
health services, 12, 27, 33, 36, 71, 229, 230, 231, 234, 238, 242, 243, 244
health status, 47, 55, 118, 141, 263, 273
healthcare, 193, 236
hearing, 51, 182, 280
hearing loss, 182
heart, 5, 114, 143, 165, 279, 281, 283
heart attack, 281
heart rate, 143
Hebrew, 80, 281, 283
helmets, 192
helplessness, 11, 17, 20, 114, 115, 122, 128, 144, 158, 266
hemorrhage, 207
hepatitis, 137
hepatitis B, 137
hepatitis C, 137
herbicide, 121
heritability, 102
heroism, 149
heterogeneous, 226, 230
high risk, 68, 121, 163, 208, 229, 243, 244, 249, 251, 255, 271
high scores, 100
high-risk, 56, 107, 117, 239, 261
hippocampal, 151, 164
hippocampus, 104, 124, 144, 160
hiring, 34
Hiroshima, 4
Hispanic, 135
HIV, 137, 239
HIV/AIDS, 239
holistic, 17, 35, 38, 39, 41, 42
holistic approach, 35, 39, 42
holistic medicine, 41
Holland, 78, 80
homeless, 262
homelessness, 222, 232, 239
homeostasis, 96, 97, 165, 279
homicide, 21, 64, 65, 67, 70, 118, 243
homicide rate, 21, 64, 65
homosexuals, 281
homovanillic acid, 105, 269, 274
hopelessness, 107, 128, 186, 210, 211, 212, 252, 256, 258, 272
hormone, 100, 107, 108, 124, 137, 160, 164, 167, 269, 270, 275
hormones, 100, 157, 270, 279
horse, 282

hospital, 58, 59, 60, 61, 78, 182, 191, 209, 210, 215, 250, 260, 280
hospital care, 182
hospitalization, 58, 59, 60, 61, 130, 185, 186, 250, 256, 268
hospitalizations, 268
hospitalized, 57, 185, 201, 215, 239, 250, 256
hospitals, 80, 250
host, 47, 73, 266
hostilities, 13, 64, 76
hostility, 4, 18, 50, 55, 120, 206, 212, 268
hotels, 86
House, 41
household, 282
households, 76
housing, 33, 59, 60, 74
housing benefit, 33
HPA, 96, 97, 98, 99, 100, 101, 102, 104, 105, 106, 108, 111, 124, 126, 144, 157, 159, 160, 161, 184, 269, 270, 272
HPA axis, 97, 98, 99, 100, 101, 102, 105, 106, 111, 124, 159, 160, 184
human, 3, 4, 5, 6, 7, 8, 9, 10, 11, 17, 18, 22, 24, 27, 29, 35, 37, 38, 45, 63, 74, 101, 108, 114, 137, 142, 143, 145, 150, 152, 161, 168, 251, 261, 278, 280
human behavior, vii, 3, 5, 6, 8, 10, 11, 17, 18, 24
human brain, 108
human condition, 161
human development, 168
human experience, 114, 142, 143
human motivation, 261
human nature, 4, 5, 6, 7, 18
human reactions, 63
human rights, 152
humanitarian, 13
humans, 3, 6, 7, 11, 18, 20, 142, 158
humiliation, 3, 11, 147
hunting, 18
hurricane, 104
Hurricane Katrina, 111
husband, 79
hyperactivity, 99, 100, 111
hyperarousal, 43, 44, 128, 159
hyperreactivity, 165
hypersomnia, 268
hypertension, 164, 171, 268
hypnotherapy, 131
hypoperfusion, 101
hypothalamic, 96, 108, 124, 136, 159, 168, 184, 188, 265, 269, 270
hypothalamic-pituitary-adrenal axis, 108, 168, 265, 269
Hypothalamic-pituitary-adrenal axis, 167
hypothalamus, 100, 124, 278
hypothesis, 10, 37, 58, 74, 75, 76, 83, 85, 86, 87, 88, 89, 91, 101, 118, 122, 125, 184, 228, 253
hypothesis test, 37

I

ICD, 58, 59, 132, 227
identity, 8, 10, 23, 50, 81, 82, 142, 202, 208, 277, 278
ideology, 10, 18
IDS, 239
IES, 125
IL-6, 160
illegal drugs, 268
illusions, 150
imagery, 150, 274
images, 266
imaging, 109, 144, 151, 190, 269, 274
immigrants, 48, 133
immigration, 162, 281
immune response, 184
immunity, 67, 70
immunoreactivity, 107
impairments, 102, 162, 191, 192, 195, 203, 208, 254
imprisonment, 43, 47, 55, 115
impulsive, 67, 119, 130, 208, 270
impulsiveness, 99, 105, 137
impulsivity, 97, 99, 101, 102, 103, 120, 128, 129, 133, 203, 204, 206, 208, 252, 268, 272
in situ, 143
in transition, 60
in utero, 105, 161
incest, 35
incidence, 21, 48, 58, 59, 66, 97, 115, 181, 182, 185, 186, 191, 193, 216, 255, 271
inclusion, 38, 116, 228, 230
income, 59, 146
increased access, 193
indecisiveness, 268
independence, 80
India, 235
indication, 37, 43
indicators, 100, 160, 209
indices, 258, 268, 269
indirect effect, 50, 64
individual characteristics, 12, 122, 127
induction, 170, 229
industrialization, 76
industrialized countries, 238
industry, 35, 81
ineffectiveness, 260
inertia, 33

infancy, 197
infants, 159, 161
infection, 283
infectious diseases, 238
inflammation, 168, 184
inflammatory, 160, 168, 188
inflammatory response, 160
Information System, 40, 229
inhaler, 278
inheritance, 102
inherited, 5
inhibition, 19, 101
inhibitor, 151
inhibitors, 128, 146, 211, 216
inhibitory, 101
inhuman, 173
injustice, 283
inmates, 59, 60
inoculation, 129
insight, 28, 32, 37, 39, 130
insomnia, 114, 158, 186, 266, 267, 268, 272
inspection, 29, 83
instability, 20, 267
instinct, 6, 7
institutions, 13, 19, 68
instruction, 82
instruments, 125, 212
insulin resistance, 164
integration, 60, 64, 65, 66, 67, 70, 74, 76, 83, 85, 86, 87, 88, 89, 90, 91, 148, 275
integrity, 47, 114, 115, 143, 158, 266
intelligence, 225, 233
intelligence tests, 225
interaction, 50, 69, 109, 124, 160, 184, 192, 253, 267, 270
interactions, 13, 32, 97, 102, 105, 106, 163, 176, 184, 251, 261
interdisciplinary, 147
interleukin, 160, 168, 184, 188
interleukin-6, 168, 184, 188
International Classification of Diseases, 58
international law, 15
interpersonal factors, 123
interpersonal interactions, 251
interpersonal relationships, 194, 195, 205
interval, 224
intervention, 5, 16, 24, 29, 35, 37, 147, 201, 203, 210, 211, 212, 215, 243, 249, 251, 258, 267, 273
intervention strategies, 24, 249, 251
interview, 118, 122, 126, 138, 176, 229
interviews, 118, 224, 231
intimacy, 114
intoxication, 59, 60
intracranial, 207
intrastate, 20
intrinsic, 5, 19, 24
intrusions, 174, 175, 266
investigative, 20, 23
Iran, 222, 281, 284
Iraq, 27, 29, 31, 34, 40, 45, 48, 54, 55, 115, 130, 132, 148, 153, 181, 182, 192, 193, 195, 200, 213, 214, 222, 231, 233, 234, 239, 245, 247, 253, 259, 265, 267, 270, 271, 273
Iraq War, 54
Ireland, 62, 201
iron, 278
irritability, 50, 114, 129, 162, 193, 204, 266
ischemic, 165
isolation, 12, 114, 203, 208, 210, 251, 254, 261
Israel, 133, 152, 161, 281
Italy, 17, 69, 76, 113

J

JAMA, 53, 55, 151, 167, 170, 231, 233, 245, 246
Japan, 91
Japanese, 69, 74
Jerusalem, 92, 281
Jewry, 81, 92
Jews, 73, 74, 75, 76, 79, 80, 81, 82, 83, 85, 86, 87, 88, 89, 90, 91, 92, 279, 281
job loss, 194
jobs, 81, 148, 242
Jordan, 188, 246, 247
Jordanian, 162
judgment, 46
jumping, 122, 241, 250
Jun, 40, 166, 167, 170, 275
justice, 43, 148, 280
justification, 7, 9
juveniles, 19

K

Katrina, 104, 111
kidnapping, 49
killing, 6, 7, 44, 49, 51, 64, 82, 119, 183, 239, 256
King, 20, 25, 61, 112, 135, 193, 200, 234, 261, 263
Kobe, 69
Korea, 228
Korean, 226, 237, 245
Korean War, 245
Kosovo, 40, 162, 169
Kuwait, 31, 161, 169

L

labeling, 153

labour, 80, 88
LAC, 139
land, 4, 32
language, 13, 80, 143, 204, 280, 281
large-scale, 6, 268
later life, 56, 166, 201
Latin America, 122, 141
Latino, 48, 55
law, 9, 15, 223, 243
laws, 4, 75, 85, 86
leadership, 19
learned helplessness, 170
learning, 8, 115, 144, 162, 164, 266
Lebanon, 25, 125, 132, 161, 162, 169
legislation, 71, 122
leisure, 74, 80
lesions, 207
lethargy, 186
liberal, 80
liberation, 56, 78, 79, 83, 277
liberty, 24
life course, 201
life cycle, 104
life expectancy, 165
life experiences, 18, 44, 96, 98, 103
lifestyles, 19, 30
life-threatening, 184, 188, 213
lifetime, 48, 56, 99, 104, 107, 115, 120, 121, 146, 161, 213, 267, 268, 273
ligand, 101, 125
likelihood, 36, 46, 51, 52, 65, 84, 119, 131, 192, 206, 238, 250, 271
limitation, 176, 192, 195, 196
limitations, 21, 40, 69, 149, 173, 176, 181, 192, 199, 231, 253, 254, 258
Lincoln, 262
linkage, 225
links, 20, 110, 187, 204, 212, 253, 257
lipoprotein, 161
liquor, 279
listening, 283, 284
lithium, 129
local government, 20, 35
localization, 208
locus, 13, 132, 159, 160
London, 14, 15, 16, 40, 81, 84, 91, 92, 107, 136, 150, 152, 153, 181, 215, 231, 232, 233, 234
loneliness, 131, 204, 210, 243, 254
longitudinal study, 103, 137
loss of consciousness, 190, 191
losses, 104, 272
love, 7, 9, 10, 18
low-intensity, 141
LSD, 126
LTD, 41
lung, 268
lung disease, 268
lupus, 239
lupus erythematosus, 239
lying, 279

M

Madison, 245
magnetic resonance imaging (MRI), 104, 151, 269, 274
maintenance, 10, 13, 119, 160, 165, 199, 211, 214
major depression, 44, 46, 47, 102, 108, 124, 134, 137, 159, 167, 184, 199, 205, 214, 216, 239, 268, 274, 275, 276
major depressive disorder, 44, 45, 46, 100, 108, 109, 143, 158, 227, 265, 267, 276
maladaptive, 127, 206, 212, 259
maladaptive beliefs, 259
males, 25, 31, 58, 59, 67, 69, 75, 89, 163, 203, 206, 207, 208, 210, 221, 227, 240, 250, 251
malignant, 8, 13, 14, 239
maltreatment, 49
management, 54, 128, 130, 131, 139, 145, 187, 198, 199, 200, 202, 203, 210, 211, 212, 215, 216, 247, 261, 272
mania, 45
man-made, 13, 157, 159, 266
MAO, 126
Maori, 123
mapping, 102
Marine Corps, 118, 245
Marines, 123, 270
marital conflict, 255
marital status, 59, 60, 77, 82, 88, 89, 126, 224, 226, 233, 247
markets, 75
Markov, 40
marriage, 75, 91, 92, 224, 240
married women, 75
Marx, 137, 264
mass media, 4
Massachusetts, 113, 245
maternal, 56, 105, 161
meanings, 147
measurement, 151
measures, 19, 33, 46, 50, 86, 87, 88, 90, 99, 123, 126, 128, 130, 135, 160, 162, 176, 187, 255, 265, 267, 272
media, 3, 4, 29, 30, 35, 36, 37, 222, 235, 236
medial prefrontal cortex, 104, 144
median, 126, 209

mediation, 23
mediators, 99, 107, 165, 166, 176, 184
medical care, 133, 148, 238
medical services, 169
medical student, 37
medications, 35, 127, 128, 129, 131, 143, 147, 241, 258, 260, 267, 272
medicine, 39, 41, 42, 143, 147, 149, 185, 212
meditation, 131
Mediterranean, 4, 56
Mediterranean countries, 4
melancholic, 159
membership, 66, 81
memory, 46, 47, 123, 129, 139, 162, 164, 170, 184, 191, 193, 195, 204, 257, 266, 281, 282
memory deficits, 195
memory processes, 123
mental disorder, 10, 11, 12, 17, 35, 41, 44, 45, 52, 55, 57, 58, 59, 60, 61, 62, 66, 70, 97, 103, 104, 105, 106, 115, 132, 142, 151, 157, 161, 166, 177, 215, 227, 228, 230, 239, 241, 243, 246, 247, 267, 273
mental health professionals, 12, 13, 14, 139, 242
mental illness, 28, 33, 36, 37, 67, 111, 137, 235, 236, 238, 239, 242, 243, 244
mental retardation, 127
mental state, 191, 204
mentally ill persons, 10
messages, 284
meta-analysis, 99, 102, 107, 109, 151, 170
metabolic, 159, 164, 166, 167, 170
metabolic syndrome, 166, 170
metabolite, 99
metabolites, 107, 111, 124
metaphors, 148
methylation, 102
methylphenidate, 211, 216
metropolitan area, 71
Mexico, 47, 51, 55, 164
Mexico City, 164
Middle East, 122
middle-aged, 206
migration, 47, 55
militant, 8, 65
military occupation, 228
Millennium, 246
mimicking, 159
mineralocorticoid, 100
mines, 30
minorities, 123
minority, 123, 144, 222
minority groups, 123
mirror, 4, 18
misleading, 28
missions, 225
Mississippi, 124, 136
Missouri, 40
mobility, 40, 186
modalities, 131
modality, 129
models, 23, 28, 35, 37, 38, 50, 63, 64, 65, 69, 103, 106, 112, 142, 143, 145, 148, 190, 267, 276
modernity, 70
modulation, 184
money, 90, 282
monoamine, 111, 126, 128
monoamine oxidase, 126, 128
monoamine oxidase inhibitors, 128
monoaminergic, 98
Montenegro, 66, 70
mood, 44, 48, 100, 107, 108, 110, 111, 129, 134, 165, 166, 184, 205, 210, 238, 258, 265, 266, 267, 268, 270, 272, 273, 275, 276, 280
mood disorder, 44, 100, 107, 108, 111, 134, 166, 238, 258, 265, 267, 268, 270, 273, 275, 276
Moon, 188
morale, 68
morbidity, 47, 51, 57, 117, 120, 128, 130, 162, 163, 166, 181, 182, 183, 184, 185, 187, 188, 203, 208, 228, 233, 247
morning, 80, 125, 168, 243, 280, 282
morphine, 185
morphological, 151
mortality, 40, 55, 61, 62, 68, 108, 116, 117, 118, 122, 130, 134, 165, 166, 171, 176, 206, 214, 215, 221, 224, 225, 226, 227, 228, 230, 231, 233, 236, 237, 238, 244, 245, 246, 247, 251, 260, 261, 267, 275
mortality rate, 225, 226, 230, 236, 237, 238, 251
mothers, 10, 49, 56, 123, 161, 168
motivation, 9, 10, 18, 24, 204, 261
motives, 6, 20
motor vehicle accident, 116, 117, 139, 160, 166, 168, 184, 190, 227, 228
motor vehicle crashes, 206
mouth, 281, 283
movement, 129
multiple sclerosis, 239
multivariate, 83, 117
murder, 79
musculoskeletal, 228
myelination, 164, 170
myocardial infarction, 188, 213

N

narcissism, 10

narcissistic, 10, 19
narratives, 145, 146, 147, 149, 196, 202
nation, 9, 38, 48, 148
National Guard, 48, 123, 222, 227, 230
National Health Interview Survey, 236
National Health Service, 226, 230
nationality, 82, 88, 89
natural, 50, 61, 63, 69, 106, 145, 147, 148, 158, 159, 160, 166, 169, 199, 236, 251, 261, 266, 267
natural disasters, 63, 69, 148, 158, 169, 267
natural science, 147
natural sciences, 147
Navy, 38, 123, 131, 223, 247
negative consequences, 252
negative life events, 52, 201, 225, 229, 231, 233, 240, 247, 258
negative outcomes, 251
negativity, 212
neglect, 87, 103, 158, 173
neoplasms, 239
Nepal, 163, 170
nerves, 44, 153
nervous system, 44, 124, 157, 160
Netherlands, v, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 103, 170
network, 12, 57
networking, 23
neural systems, 5
neurobehavioral, 216
neurobiological, 6, 102, 106, 144, 146, 270
neurobiology, 97, 106, 107, 124, 137, 147, 150, 167
neurodegeneration, 108
neurodegenerative disorders, 127
neuroendocrine, 125, 166, 167, 168
neuroimaging, 111, 150
neurological deficit, 191, 204
neuronal excitability, 125
neurons, 164
neuropathological, 206
neuropeptide, 100, 107, 144, 145, 161, 270
neuropsychiatric disorders, 146
neuropsychopharmacology, 110
neuroscience, 40
neuroses, 24
neurotic, 18, 227
neurotransmission, 101, 105
neurotransmitter, 107
neurotransmitters, 44
neurotrophic, 161
New England, 69, 71
New Jersey, 113
New York, 15, 16, 25, 40, 62, 70, 92, 95, 107, 133, 135, 150, 152, 153, 165, 169, 170, 188, 198, 201, 202, 216, 245, 246, 247, 264, 265, 275, 277
New York Times, 133, 275
New Zealand, 27, 28, 39, 40, 103, 110, 124, 136
news coverage, 14
newspapers, 81
next generation, 54
NHIS, 236
NHS, 181, 229, 230, 234
Nietzsche, 6
nightmares, 46, 51, 54, 114, 131, 159, 162, 243, 266
nitric oxide, 200
NMDA, 145
nongenetic, 161
nongovernmental, 13
non-random, 36
nonverbal, 161
nonverbal communication, 161
non-violent, 208
noradrenaline, 103, 160, 166
norepinephrine, 124, 159, 269, 270
normal, 10, 11, 21, 44, 112, 124, 127, 130, 142, 143, 146, 147, 149, 160, 184, 190, 240, 272
normal development, 11
norms, 12, 33, 64, 74, 75, 83, 91, 243
North America, 224
North Atlantic, 248
North Atlantic Treaty Organization (NATO), 70, 248
Northern Ireland, 40, 71
Norway, 76, 224
nuclear, 24
nuclei, 101
nucleus, 165

O

obesity, 164, 170, 200
obligations, 11, 148
observations, 113, 185, 254, 265, 267, 270
occupational, 123, 153, 196, 228, 240, 266, 267, 268
odds ratio, 65, 103
olanzapine, 129
old age, 128, 174
older adults, 56, 175, 176, 214
older people, 104, 111, 240
Operation Enduring Freedom (OEF), 182, 190, 192, 195, 201, 230, 227, 237, 243, 262, 270, 271
Operation Iraqi Freedom (OIF), 182, 190, 192, 195, 200, 201, 227, 230, 237, 243, 262, 270, 271
opiates, 46
opioids, 270
oppression, 3, 5

orbitofrontal cortex, 101
organ, 193
organic, 18, 44, 46, 121
organism, 97, 100, 157, 159, 164, 165
orientation, 19
orthodox, 80
osteoporosis, 165
outpatient, 130, 256, 257, 261, 268
outpatients, 138, 246, 252, 261, 268, 276
overweight, 240
oxide, 200
oxygen, 278
oxytocin, 100

P

pain, 6, 41, 47, 49, 61, 114, 127, 184, 185, 195, 196, 197, 252, 253, 255, 256, 257, 259, 261, 281
panic disorder, 45, 46, 128
paradox, 91, 146, 152, 215
paradoxical, 146
paralysis, 46, 182
parameter, 99, 163
paranoia, 129
parasympathetic, 124
parasympathetic nervous system, 124
parental support, 12
parent-child, 103, 163, 170, 255
parenting, 21, 25, 161, 238, 263
parents, 9, 22, 32, 49, 51, 53, 56, 78, 105, 158, 159, 161, 163, 170, 225, 278, 282
Paris, 70, 91, 110
Parkinson, 204, 212
Parliament, 81
paroxetine, 126, 128, 211
partnership, 13
partnerships, 230
passive, 10
passive-aggressive, 10
pastoral, 18
pathogenesis, 103, 122, 145, 149, 170
pathogenic, 96
pathology, 10, 200, 208, 266, 272
pathophysiological, 137
pathophysiology, 126, 144, 160, 171, 270, 272
pathways, 110, 123, 212, 252, 256
Peacekeepers, 224
peacekeeping, 222, 224, 225, 229, 231, 233, 244, 247
Peacekeeping Operations, 132
pediatric, 160, 161, 162, 163, 165, 166
peer, 12, 21, 50, 116, 131
peers, 123
peptic ulcer, 239
peptide, 100
perception, 68, 91, 186, 252, 254, 255, 258
perceptions, 25, 30, 257, 259, 260
Persian Gulf War, 24, 41, 42, 53, 135, 233, 245
personal attractiveness, 207
personal problems, 31
personal relations, 182
personal relationship, 182
personality, 9, 10, 11, 12, 13, 16, 17, 18, 19, 24, 27, 44, 46, 50, 51, 57, 60, 105, 111, 115, 120, 158, 187, 205, 208, 209, 212, 242
personality characteristics, 187
personality dimensions, 16
personality disorder, 9, 10, 11, 46, 57, 105, 111, 120, 205
personality factors, 24
personality traits, 115, 212
personality type, 10
persuasion, 85
PET, 101
PFC, 99, 100, 101
pharmaceutical, 57, 61
pharmacological, 23, 101, 128, 129, 145, 147, 216, 272
pharmacological treatment, 128, 272
pharmacotherapy, 59, 60, 128, 129, 132, 138, 144, 210, 211, 212, 216, 272
phenomenology, 175
phenotypes, 99, 102
Philadelphia, 70, 132, 250, 272
Philippines, 20
philosophers, 143
philosophical, 4
philosophy, 3, 4, 32, 33, 150
phobia, 46
phone, 280, 283
photon, 151
phylogenetic, 9
physical abuse, 110, 115, 126, 132, 158
physical health, 32, 50, 159, 223
physicians, 76, 78, 224, 229, 272
physiological, 19, 95, 96, 97, 98, 127, 191, 204, 266, 278
physiology, 146
pilot study, 41, 107, 138, 153, 275
pilots, 74
pituitary, 96, 108, 124, 136, 137, 159, 167, 184, 188, 269, 270
pituitary adrenal, 136, 270
pituitary gland, 124
placebo, 54, 125, 128, 138, 216, 269
planning, 22, 121, 197, 242, 270, 275
plasma, 100, 107, 125, 136, 160, 167, 269

plasma levels, 107, 136
plasticity, 106, 112, 164
platelet, 99, 126, 127, 137
Plato, 6
play, 18, 22, 66, 95, 101, 119, 121, 131, 144, 146, 147, 158, 159, 163, 164
pleasure, 268, 282
pluralism, 92
poisoning, 117, 118, 184, 208, 241
Poisson distribution, 224
Poland, 91
police, 81, 84, 150
policy makers, 4, 20
policy making, 28
policymakers, 245
political crisis, 60
politicians, 4
politics, 92
polygenic, 161
polymorphism, 109, 214
polymorphisms, 98, 102
poor, 6, 30, 44, 46, 47, 49, 50, 55, 103, 106, 129, 161, 162, 186, 191, 222, 224, 229, 241, 242, 255, 266, 272
poor health, 44, 47
population group, 17, 19, 157
Portugal, 80
positive relation, 117
positive relationship, 117
positron, 150
post traumatic stress disorder, 141, 227, 235
postmortem, 107
postsynaptic, 107
poverty, 5, 21, 33, 47, 49
power, 3, 4, 9, 10, 18, 48, 253, 272
powers, 18
preclinical, 184
predictability, 160, 170
prediction, 52, 66, 106, 107, 108, 111, 136, 201
predictive model, 106, 262
predictors, 95, 104, 145, 252, 261, 262, 263, 272, 276
predisposing factors, 97, 118
pre-existing, 32, 189, 192, 193, 194, 195, 197
prefrontal cortex (PFC), 99, 104, 107, 144, 150, 160, 206
pregnancy, 36, 41, 48, 161, 168
prejudice, 280
preparedness, 152
preschool, 159
preschoolers, 163
prescription drugs, 28, 34, 39
pressure, 97, 165, 171, 182, 192, 277
prevention, 13, 14, 27, 28, 29, 30, 31, 33, 35, 36, 37, 38, 40, 41, 52, 61, 71, 95, 103, 110, 111, 130, 132, 152, 153, 187, 203, 210, 211, 212, 214, 215, 216, 221, 229, 231, 232, 235, 242, 244, 248, 249, 251, 258
preventive, 47, 112, 113, 147, 242, 243
primary care, 55, 123, 224, 229, 251, 261, 273
primary caregivers, 123
primates, 170
prisoners, 16, 43, 47, 52, 79, 175, 279
prisoners of war, 16, 52
prisons, 36
proactive, 187
probability, 254, 258, 270
probe, 269
problem-solving, 11, 23, 24, 104, 105, 197, 203, 212, 217, 255, 263
problem-solving skills, 104, 105, 212
production, 22, 159, 168
productivity, 267
profit, 18
prognosis, 271
program, 40, 80, 243
programming, 105, 161, 168
pro-inflammatory, 160, 168, 184
projectiles, 193
prolactin, 99, 108, 136
promoter, 109, 214
propaganda, 68
property, 29, 45, 49, 141
prophylaxis, 24, 147
propranolol, 152
prosocial behavior, 21, 25
prostitution, 48
protection, 28, 36, 37
protective factors, 68, 106, 194, 251
protective role, 163
Protestants, 74, 75, 76, 77, 80, 85
provocation, 150, 257, 269
proxy, 255
pruning, 164
psyche, 11, 13
psychiatric diagnosis, 224, 253, 266, 270
psychiatric disorder, 19, 45, 46, 47, 52, 54, 58, 67, 98, 99, 102, 105, 110, 115, 120, 127, 133, 136, 146, 147, 148, 158, 161, 171, 203, 204, 205, 209, 213, 214, 215, 238, 239, 246, 250, 266, 276
psychiatric disorders, 19, 45, 46, 47, 54, 98, 99, 102, 105, 110, 115, 120, 127, 133, 136, 146, 147, 148, 158, 171, 203, 204, 205, 213, 214, 215, 239, 250, 276
psychiatric illness, 55, 97, 98, 183, 213, 250

psychiatric morbidity, 47, 162, 182, 183, 187, 203, 208
psychiatric patients, 61, 96, 104, 107, 122, 127
psychiatrist, 34, 78
psychiatrists, 14, 33, 143, 153
psychobiology, 138, 272
psychological development, 51, 166
psychological distress, 47, 48, 52, 125, 141, 163, 224, 243, 254, 262
psychological health, 43, 46
psychological pain, 6, 128
psychological problems, 234
psychological processes, 147, 187
psychological stress, 53, 66, 136
psychological stressors, 53
psychology, 15, 20, 24, 73, 149, 277
psychopathology, 12, 49, 97, 103, 106, 127, 137, 141, 142, 146, 149, 159, 160, 162, 163, 166, 168, 177, 199, 212, 213, 266
psychoses, 47, 105, 227
psychosis, 47, 91, 105, 112, 127, 136, 190, 191, 199, 201, 205, 272
psychosocial development, 22, 25
psychosocial functioning, 17, 129, 191, 199
psychosocial stress, 112
psychosomatic, 11, 46
psychotherapeutic, 22, 23, 212
psychotherapy, 22, 23, 24, 120, 129, 131, 144, 151
psychotic, 41, 46, 105, 119, 126, 129, 190
psychotic states, 119
psychotic symptoms, 46, 129
PsycInfo, 116
PTA, 191
PTM, 265, 270, 271, 272
puberty, 160
public health, 13, 23, 28, 221, 267
pumping, 281
punishment, 6
PVN, 165

Q

qualitative research, 231
quality of life, 10, 27, 30, 32, 34, 35, 36, 38, 41, 47, 53, 55, 177, 262
quetiapine, 129

R

race, 85, 86, 116, 124, 227
racism, 47
range, 5, 12, 43, 45, 46, 52, 57, 66, 68, 114, 123, 142, 143, 144, 147, 173, 174, 182, 183, 185, 190, 191, 193, 204, 205, 207, 208, 231, 255
rape, 35, 43, 48, 51, 56, 114, 266, 274
raphe, 101
rapid eye movement sleep, 269
rating scale, 138
ratings, 111, 125
rats, 150
reactivity, 162, 205
reading, 284
real estate, 70
reality, 18, 23, 56, 186
recall, 158, 176
reception, 23
receptors, 100, 125, 126, 144, 269
recession, 32
recidivism, 19
recognition, 34, 113, 139, 181, 229, 242, 266, 272, 283
reconcile, 247
reconciliation, 13, 43, 150
record keeping, 31
recovery, 5, 13, 20, 25, 100, 143, 150, 191, 198, 199, 247, 266
recreational, 258
reflection, 67, 223, 236
refractoriness, 129
refractory, 129
refuge, 90
refugee camps, 47
refugees, 5, 10, 11, 16, 20, 47, 51, 52, 55, 80, 86, 88, 122, 123, 136, 137, 150, 168, 273, 274
regional, 23, 30, 230
registries, 191, 224
regression, 9, 126, 226, 228, 240
regression analysis, 226, 240
regressions, 118
regular, 12, 224, 226, 227, 230, 232, 243, 247, 251
regulation, 60, 64, 74, 75, 100, 101, 102, 108, 161, 168, 184, 197, 269
regulations, 71
rehabilitation, 121, 131, 188, 199, 200, 203, 216
rehabilitation program, 121
rejection, 67
relationship, vii, 4, 9, 16, 28, 31, 34, 36, 37, 38, 46, 49, 51, 52, 53, 57, 59, 60, 63, 69, 95, 99, 100, 101, 102, 106, 110, 115, 117, 119, 121, 122, 130, 147, 170, 183, 191, 192, 193, 199, 203, 208, 213, 225, 227, 233, 238, 240, 252, 254, 255, 256
relationship quality, 255
relationships, 11, 12, 19, 20, 46, 56, 96, 103, 114, 177, 182, 187, 194, 195, 205, 229, 243, 255, 258, 263
relatives, 12, 28, 139, 210
relaxation, 129

relevance, 61, 64, 69, 71, 171, 182, 195, 243, 249, 253
reliability, 68, 71, 135, 136
religion, 9, 10, 77, 78, 79, 82, 284
religiosity, 19, 24
religious groups, 9, 90
remission, 211
renal disease, 239
renal failure, 186
reparation, 23
repatriation, 225, 231, 233, 240, 247
repetitions, 50
repetitive behavior, 50
repression, 18, 141
reprocessing, 129
research funding, 39
resettlement, 47, 55, 230, 234
residential, 121, 250, 261
residuals, 43
resilience, 13, 16, 20, 25, 106, 112, 141, 142, 146, 148, 149, 150, 152, 153, 163, 173, 176, 280
resistance, 14, 78, 79, 81, 82, 90, 124, 131, 164
resolution, 13
resources, 11, 20, 39, 74, 75, 96, 147, 162, 212, 258
responsiveness, 158
restructuring, 259
retardation, 268
retirement, 104, 174
Reynolds, 260
risk assessment, 131, 188, 190, 194, 195, 197, 258, 260
risk behaviors, 117, 267
risk factors, 20, 21, 23, 47, 52, 68, 96, 103, 106, 110, 111, 115, 117, 122, 150, 175, 191, 192, 193, 194, 195, 197, 198, 201, 203, 205, 208, 212, 213, 229, 231, 235, 237, 238, 239, 241, 242, 244, 246, 247, 249, 253, 258, 259, 261, 262, 270
risk management, 131, 187
risk profile, 104
risks, 57, 177, 185, 215
risk-taking, 236
risperidone, 129
rivers, 78, 80, 82, 84
roadside bombs, 270
Rome, 113
Rouleau, 201
Royal Society, 152, 233
RTI, 118
rural, 25, 38, 59, 60, 75, 76
rural areas, 75, 76
rural communities, 25
Russian, 166

S

sacred, 9, 15
sadism, 8
sadness, 44, 50, 114, 116, 278, 281, 282, 284
safeguards, 24, 36
safety, 20, 33, 145, 148, 197, 243, 281
saliva, 125, 136
salivary glands, 125
sample, 25, 33, 36, 56, 61, 103, 104, 110, 111, 115, 116, 117, 118, 119, 120, 121, 122, 123, 126, 127, 128, 129, 162, 163, 173, 175, 188, 191, 208, 223, 225, 226, 228, 230, 250, 251, 252, 256, 257, 263, 268, 273
sanctions, 12, 23, 68
artorius, 14
satisfaction, 33, 262, 263
scepticism, 67, 145
schema, 18
schemas, 206, 214
schizophrenia, 45, 57, 59, 101, 105, 109, 112, 127, 138
schizophrenic patients, 101, 139
school, 12, 22, 50, 80, 81, 103, 104, 139, 159, 162, 163, 169, 236, 282, 283
school failure, 50
school performance, 50
schooling, 22, 77
scores, 47, 51, 99, 100, 115, 225, 268
search, 28, 29, 31, 32, 116, 174, 281
Second World War, 40, 62, 65, 68, 69, 143, 145, 153, 162
secret, 68, 78, 279
Secretary of State, 40
secretion, 97, 105, 108, 124, 157, 159, 160, 164, 269
security, 18, 20, 33, 153, 162
segmentation, 90
seizures, 204, 216
selective serotonin reuptake inhibitor, 128, 151
Self, 37, 42, 71, 199, 215, 242
self esteem, 242
self-destruction, 261
self-destructive behavior, 21, 119, 128, 129
self-efficacy, 254
self-esteem, 12, 33, 50, 104, 181, 207, 241
self-observation, 146
self-regulation, 197
self-report, 46, 110, 125, 162, 174, 176, 177, 195, 199, 210, 215, 224, 226
self-reports, 199, 215
self-verification, 196, 202
self-view, 196
semantic, 44

semi-structured interviews, 231
sensation, 185
sensations, 119, 129
sensitivity, 23, 144, 168, 269
sensitization, 164
separation, 11, 22, 45, 49, 103, 162, 210, 255
September 11 (9/11), 40, 104, 111, 148, 153
sequelae, 20, 22, 45, 135, 153, 174, 189, 190, 192, 196, 198, 200, 208, 213, 214, 216
Serbia, 3, 65, 66, 67, 70
serotonergic, 98, 99, 100, 101, 102, 105, 106, 107, 108, 125, 126, 206, 265, 272
serotonin, 95, 96, 98, 99, 101, 102, 107, 108, 109, 128, 137, 144, 146, 151, 161, 167, 211, 214, 216, 270
sertraline, 128, 138, 216
serum, 101, 126, 136, 168
services, 12, 23, 27, 30, 33, 34, 35, 36, 68, 71, 148, 169, 198, 211, 224, 229, 230, 231, 234, 236, 238, 242, 243, 244, 249, 250
severe stress, 18, 133, 158, 159, 160, 165, 272
severity, 12, 20, 49, 54, 115, 119, 121, 123, 131, 144, 151, 157, 160, 167, 168, 174, 183, 185, 190, 191, 192, 199, 204, 208, 209, 213, 256, 257, 263, 267, 268, 274
severity levels, 192
sex, 18, 164, 205, 227
sex steroid, 164
sexual abuse, 11, 35, 103, 110, 126, 158, 164, 170, 238, 266
sexual activity, 21
sexual assault, 115, 146
sexual assaults, 146
sexual behavior, 21
sexual harassment, 123
sexual orientation, 104
sexual violence, 48, 122
sexually abused, 167
shame, 114
sharing, 11, 242, 255
shelter, 145, 161
shock, 44, 114, 122, 143, 266, 280
short period, 3, 5
short-term, 43, 45, 50, 104, 129, 170, 174, 191, 215, 239, 258
short-term memory, 170
shoulders, 279
sibling, 162
side effects, 128
sign, 145, 182
signalling, 126
signals, 44
signs, 31, 36, 190, 196, 197, 204, 210
similarity, 115, 126
sites, 99, 100, 102, 107, 108, 126
skills, 12, 35, 104, 105, 203, 211, 212, 217, 243, 255
slavery, 18, 48, 75, 280
slaves, 4, 75
sleep, 47, 54, 100, 131, 159, 162, 184, 204, 243, 269
sleep disturbance, 47, 54, 131, 162, 204, 243
sleeping problems, 49
Slovenia, 17
smoking, 97, 126
SMR, 191, 224, 225, 227, 229
SNS, 159, 160
soccer, 80
social anxiety, 24, 54
social behavior, 19, 20
social capital, 70, 148
social change, 27, 30, 37, 38, 58
social class, 18
social cohesion, 70
social consequences, 143
social context, 5, 69, 146, 148
social control, 6, 143
social environment, 10, 12, 239
social exclusion, 222
social factors, 40, 57
social group, 18, 258
social identity, 23
social impairment, 268
social influence, 9, 20
social institutions, 18
social integration, 60, 64, 65, 67
social isolation, 114, 203, 208, 251, 261
social learning, 8
social network, 12, 57
social norms, 33
social phobia, 128, 165, 170
social psychology, 69
social regulation, 60, 64, 161
social relations, 12, 258
social relationships, 12, 258
social security, 33, 162
Social Security, 229
social stress, 97, 102
social support, 20, 45, 50, 51, 60, 104, 111, 115, 123, 132, 133, 144, 163, 176, 191, 211, 229, 240, 242, 243, 244, 255, 260, 266, 268
social upheaval, 68
social withdrawal, 50, 115, 266
social work, 33, 283
social workers, 33
socialism, 60
socioeconomic, 21, 60, 62, 203, 205
socioeconomic status, 21, 203, 205

sociological, 21, 67, 70
sociologists, 64, 77, 143
sociology, vii, 15, 62, 73
sociopsychological, 20
solidarity, 20
Somali, 55
somatic symptoms, 273
Somatoform, 19
somatostatin, 108
South Africa, 141, 147, 152, 153
Spain, 80, 95, 97, 107
species, 7
specificity, 104, 146, 201
SPECT, 101
spectrum, 127, 158, 159, 211
speech, 204, 284
speed, 196, 204
spheres, 22
spinal cord, 182, 185, 186, 188, 213, 239
spinal cord injury, 182, 185, 188, 213
spine, 266, 279
spiritual, 4, 9, 19, 104
spirituality, 10
Sri Lanka, 62, 65, 66, 69, 70, 163, 169
SRIs, 128, 211
St. Louis, 15
stability, 6, 11, 19, 97, 111
stabilizers, 129
stages, 9, 106, 159, 229, 281
stakeholders, 36
standard of living, 21, 30
standards, 74, 211, 229
starvation, 165
statistical analysis, 116
statistics, 29, 68, 71, 77, 78, 80, 88, 91, 271
stereotype, 23
stereotypes, 18
steroid, 125, 126, 137, 164
steroids, 125, 126, 137
stigma, 31, 131, 139, 145, 159, 182, 242, 244
stimulus, 257
Stochastic, 40
stock, 75
stomach, 281
storage, 126
strain, 11
strategies, 24, 28, 31, 37, 95, 99, 113, 127, 130, 131, 196, 197, 210, 212, 217, 229, 231, 235, 242, 249, 251, 258, 260, 266
stratification, 227
strength, 90, 105, 119, 222
stress reactions, 50, 113, 114, 116, 124, 162, 166, 169, 170, 240, 247
stressful events, 51, 114
stressful life events, 97, 103, 104, 239
stressors, 20, 25, 47, 50, 53, 96, 97, 98, 102, 103, 104, 105, 106, 111, 114, 115, 117, 123, 130, 132, 158, 159, 162, 164, 173, 210, 265, 267, 270
stress-related, 45, 95, 97, 98, 111, 129, 133, 148, 160, 266
stroke, 188, 213
structural changes, 109
students, 36, 37, 41, 195, 262, 284
stupor, 281
subgroups, 269
subjective, 112, 114, 115, 135, 137, 145, 185, 191, 194, 258
subjective experience, 145, 185, 194
subjective stress, 137
substance abuse, 11, 19, 23, 97, 118, 120, 121, 127, 128, 130, 158, 165, 191, 192, 194, 203, 208, 211, 212, 238, 242, 243, 246, 266, 267, 272
substance use, 96, 97, 105, 117, 121, 205, 258, 261
substances, 12, 235, 262, 266
substitution, 15, 122
suburban, 38
suffering, 12, 13, 23, 43, 45, 57, 61, 66, 106, 112, 121, 147, 153, 163, 175, 185, 203, 210, 217, 265, 266, 269, 270, 271, 272, 280, 283
suicidal ideation, 41, 52, 56, 95, 97, 98, 100, 102, 103, 110, 113, 115, 117, 119, 120, 121, 122, 124, 126, 128, 130, 134, 184, 201, 203, 205, 206, 209, 240, 246, 247, 249, 250, 251, 252, 253, 254, 257, 259, 261, 262, 264, 265, 268, 271, 272, 275
suicide attempters, 97, 100, 101, 103, 105, 107, 108, 109, 110, 111, 120, 121, 126, 241, 276
suicide completers, 124, 209
superior temporal gyrus, 101, 109
supervisors, 123, 242
supplemental, 258
support services, 30
suppression, 98, 100, 107, 109, 111, 124, 136, 168, 269, 275
Surgeon General, 34, 187, 231
surgical, 250
surplus, 86
surveillance, 81, 191, 243, 244
survey design, 29
survival, 7, 8, 51, 55, 91, 118, 181, 188, 192, 200, 270
surviving, 7, 55, 121, 163, 182, 198, 212
survivors, 5, 34, 39, 44, 52, 53, 54, 55, 56, 92, 105, 112, 136, 146, 148, 152, 161, 164, 165, 167, 168, 173, 174, 176, 183, 194, 196, 206, 269, 277
susceptibility, 109, 115, 161
Sweden, 52, 76, 137, 222, 225, 237

sweets, 280
swelling, 186
Switzerland, 76, 198
symbolic, 5, 18
symbols, 9, 18
sympathetic, 97, 124, 157, 159, 160
sympathetic nervous system, 97, 124, 159, 160
syndrome, 4, 11, 16, 44, 46, 95, 106, 113, 114, 139, 143, 145, 153, 158, 165, 166, 170, 204, 266
synergistic, 187
synthesis, 73, 125, 142
systematic desensitization, 129
systemic lupus erythematosus, 239
systolic blood pressure, 165

T

targets, 9, 21, 34, 103, 144, 258, 267
task force, 271
TBIs, vi, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212
Tel Aviv, 41
telephone, 118, 131, 223, 243, 248
television, 51
TEM, 136
temperament, 111
temperature, 125
temporal, 30, 33, 37, 38, 101, 109, 199
tension, 266, 282
territory, 4, 58, 76
terrorism, 4, 9, 10, 14, 15, 16, 31, 49, 153, 267
terrorist, 3, 5, 10, 12, 15, 104, 153, 200, 270, 278
terrorist attack, 3, 5, 12, 104, 153
terrorists, 10, 14
test scores, 225, 233
testimony, 40
testosterone, 126
testosterone levels, 126
tetrachlorodibenzo-p-dioxin, 121
Texas, 15, 249, 250
textbooks, 185
Thailand, 55
thalamus, 269
therapeutic process, 259
therapeutic targets, 144, 258
therapy, 19, 23, 35, 39, 60, 129, 131, 143, 243, 259
thinking, 39, 194, 259, 262, 266, 271, 281, 282
Thomas Hobbes, 6
threat, 7, 12, 20, 49, 62, 68, 114, 115, 127, 143, 158, 173, 266
threatened, 57, 63, 114, 266
threatening, 70, 123, 144, 184, 188, 213
threats, 12, 47, 243, 250, 270
threshold, 52, 96, 211
thyroid, 160, 270
time periods, 59, 60, 165
time series, 77, 85, 90
time-frame, 145
timing, 157, 231, 270
toddlers, 159
tolerance, 13, 195, 196, 252, 257, 261
torture, 5, 11, 44, 114, 122, 135, 152, 173
toxic, 121, 212
toys, 282
TPH, 99, 109
tracking, 129
trade, 190
tradition, 5
traffic, 188, 251, 274
training, 10, 16, 19, 32, 34, 35, 36, 37, 129, 142, 201, 203, 211, 212, 229, 243, 257, 259, 271
training programs, 211
traits, 18, 111, 118, 161
trajectory, 44
tranquilizers, 48
transfer, 81
transgenerational, 13, 54, 150, 161
transition, 60, 201, 222
translational, 265
transmission, 13, 22, 54, 162
transport, 87, 206, 278
transportation, 86, 87, 91, 196
traumatic brain injury, 181, 182, 188, 189, 198, 199, 200, 201, 202, 204, 205, 208, 209, 210, 212, 213, 214, 215, 216, 217, 229, 271
traumatic events, 12, 45, 46, 47, 49, 50, 52, 54, 103, 104, 114, 115, 127, 141, 143, 145, 147, 148, 149, 161, 163, 173, 174, 175, 266, 267, 269
traumatic experiences, 12, 22, 49, 50, 52, 116, 129, 141, 142, 147, 148, 158, 162, 164, 267
trial, 80, 138, 152, 216
tricyclic antidepressant, 211, 216
triggers, 270, 278
Truth and Reconciliation Commission (TRC), 147, 152
tryptophan, 99, 107, 109
TSH, 136
tsunami, 148, 153
twin studies, 102
typology, 67
tyrosine, 269

U

U.S. economy, 267
U.S. military, 246
Uganda, 48, 53

uncertainty, 17, 45, 49, 121, 186
unemployment, 23, 28, 33, 47, 64, 104, 132, 203, 208, 222, 253
UNICEF, 12
United Arab Emirates, 56
United Kingdom, 41, 63, 181, 221, 267
United Nations (UN), 125, 222, 247
United States, 52, 55, 70, 76, 110, 121, 123, 133, 135, 139, 143, 146, 190, 198, 210, 225, 227, 228, 234, 239, 241, 247, 249, 263, 267, 273
unpredictability, 17
urban areas, 60, 76
urinary, 100, 103, 124, 136, 160, 167
US Department of Health and Human Services, 231
USSR, 71

V

Valencia, 95
validation, 169, 177, 194
validity, 135, 136, 142, 151, 169, 232
values, 10, 97, 161
variability, 104, 183, 191
variables, 20, 23, 25, 28, 29, 37, 71, 97, 104, 122, 123, 126, 130, 144, 148, 160, 187, 226
variance, 102, 253
variation, 64, 67, 71, 107
vasopressin, 100
venlafaxine, 128, 211, 216
ventrolateral prefrontal cortex, 99, 107
victimization, 5
victims, 4, 12, 22, 23, 43, 47, 49, 51, 52, 53, 58, 59, 60, 82, 87, 99, 100, 107, 108, 122, 146, 149, 152, 158, 161, 169, 176, 182, 188, 203, 204, 205, 206, 208, 209, 215, 266, 274
Vietnam War, 44, 113, 114, 130, 131, 135, 136, 149, 188, 235, 236, 245, 247, 251, 256, 262
Vietnamese, 256
violence, vii, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 20, 45, 47, 48, 49, 55, 115, 117, 121, 122, 133, 141, 143, 144, 145, 159, 166, 169, 255, 256, 257, 258, 259, 263, 264, 267, 271
violent, 4, 9, 19, 20, 22, 30, 40, 48, 49, 51, 71, 76, 99, 143, 144, 147, 148, 149, 162, 208, 252, 257, 266
violent behavior, 50, 252
visible, 30, 45, 85, 196
vision, 186, 204
visual field, 129
vitamins, 182
voice, 14, 280, 281, 283
voluntarism, 20
volunteer work, 24
vomiting, 46
vulnerability, 52, 97, 107, 112, 116, 121, 123, 124, 144, 151, 152, 157, 161, 166, 184, 224, 229, 271

W

Wales, 62, 71, 76
war crimes, 53, 175
war years, 65, 66, 73, 74, 78, 79, 85, 90
warfare, 8, 18, 27, 30, 48, 55, 142, 146, 181, 186, 270, 271
weakness, 142, 176, 272
weapons, 7, 19, 48, 176, 192, 257, 259
wear, 81, 100, 281
well-being, 14, 19, 20, 24, 48, 66, 141, 162, 191, 258, 259
western countries, 145
Western Europe, 224
western models, 145
white matter, 101, 109
Wisconsin, 236, 245
withdrawal, 61, 159, 175, 186, 205, 252, 254
witnesses, 22, 49, 51, 279
wives, 49, 53, 56
workers, 34, 145, 146, 174, 208, 258
World Health Organization (WHO), 4, 13, 14, 132, 151, 192, 221, 231
World Trade Center, 168
World War, vi, 3, 6, 7, 40, 52, 54, 62, 65, 66, 67, 69, 73, 74, 75, 76, 77, 78, 79, 83, 84, 85, 87, 88, 89, 90, 91, 114, 143, 145, 148, 149, 153, 161, 162, 173, 174, 175, 177, 182, 185, 186, 189, 226, 230, 253
World War I, vi, 3, 6, 7, 52, 54, 66, 67, 73, 74, 75, 76, 77, 78, 79, 83, 84, 85, 87, 88, 89, 90, 91, 148, 149, 153, 161, 173, 174, 175, 177, 182, 185, 186, 189, 253
World War II, vi, 7, 52, 54, 66, 67, 73, 74, 75, 77, 78, 79, 83, 84, 85, 87, 88, 89, 90, 91, 148, 149, 153, 161, 173, 174, 175, 177, 182, 185, 186, 189, 253

Y

young adults, 55, 110, 162, 165, 275
Yugoslavia, 12, 25, 70, 122